GAS JOURNAL

LIGHT ∴ HEAT ∴ POWER

BYE-PRODUCTS.

Founded in 1849 as the "Journal of Gas Lighting."

VOL. CLXXXIII.

JULY TO SEPTEMBER, 1928.

LONDON:

WALTER KING, LTD.,

11, BOLT COURT, FLEET STREET, E.C. 4.

1928.

GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

PROPRIETORS: WALTER KING, LIMITED — OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

Telephone: Central 6055. — Telegrams: "GASKING, FLEET, LONDON."

VOL. CLXXXIII. No. 3398.] WEDNESDAY, JULY 4, 1928. [80TH YEAR.

Editorial Notes.

On the Distribution System.

THE gas-pipe makers, like the electrical cable makers, have had a good time the last few years. There are not many gas undertakings that have not had to do a fairly considerable amount in the way of pipe laying for one reason or another. Through gas-business developments and a larger concentration of demand, there have been pipe enlargements; through the same causes, there has been the belting of areas or arterial pipe laying through them for boosting purposes; there has also been considerable linking-up of outlying areas; and there has been a forward movement in the laying of trunk mains for the transmission of coke-oven gas. An altogether happy combination of circumstances has existed which has made the demand for all sizes of pipes greater than normally obtains; and we have no doubt the makers hope this will continue. In the capital account and in the "distribution" section of the revenue account, it can be seen what a large amount of money has been spent in later years in these directions. Of course, it has not all gone to the pipe makers. Materials cost more; and so does labour, and pipe laying in roads becomes a more costly operation year by year, owing to changing methods of construction.

All this work is for new business, and yet all is at a much heavier expense per unit of carrying capacity. This means that the most vigorous care must be taken in determining what work is required, having regard not only to the present but to future developments. We cannot afford to be wasteful in these days of pressure for economy; we cannot afford to under-estimate, and find that in a few years the same pipe-line has already become insufficient, and the supply inefficient in quantity and pressure in the same area. We must apply science and circumspection in order to realize what we need now and in future on the most satisfactory lines. That was the lesson enforced by the paper which Mr. Stephen Lacey, B.Sc., Assoc.M.Inst.C.E., Distributing Engineer to the Gas Light and Coke Company, read before The Institution of Gas Engineers at Cardiff. It is true the paper dealt with "The Economic Aspects of High-Pressure Distribution;" but whether a line of pipes has to convey gas at high or normal pressure, whether or not it has to meet variations in demand, the engineer who studies Mr. Lacey's paper will find in it assistance to practical judgment. Distribution problems, which were at one time simply called "extensions" or "enlargements," cannot be dealt with now on the old rule-of-thumb basis, which only required a man to decide that (for example) an 8-in. main would suffice where a 6-in. one previously existed.

That is not what Mr. Lacey advises, and it is not what Mr. H. C. Smith, the Chief Engineer of the Tottenham District Light, Heat, and Power Company, did in connection with his efforts to give every consumer in the Company's area an even pressure during the twenty-four hours, which is not an easy thing in a district such as Tottenham, the growth of which has been proceeding so vigorously for a great many years. Roughly stated, the scheme adopted in order to effect this desideratum was to lay a main, 48-in. at the start, reduce it to a 30-in., and then to a 24-in., with Bryan Donkin boosters, Peebles governors, and Widlake recorders. Apart from the proof given in the paper that the system achieved its object, it includes a vast amount of practical information on the subject of pressure drops, costs of mainlaying, &c., which will be very valuable. For the Widlake recorder, Mr. Smith has nothing but praise—its excellence of design and the manner in which it functions are objects of admiration. It has been the practical solution of the reduction of boosting to the minimum. Mr. Smith has succeeded. But the total cost of the work was £113,307, which some Boards of Directors would look at with very scrutinizing eyes as to the value that would be obtained for such an outlay. But that is not the sum that really matters. The important thing is the capital charges, which are £7365 per annum, to which has to be added an annual rental of £177 paid to the G.P.O. for the use and maintenance of the lines supplied in connection with the Widlake recorders. The £7542 represented by these two amounts brings us up against an old argument advanced by Mr. Smith. He has always been of opinion that adequate supply and pressure are of more importance in giving the consumers' satisfaction than inspection and maintenance of appliances. We should say they are primary essentials; and to our mind inspection and maintenance of appliances are supplementary to a condition of affairs which it is the duty of every gas engineer to provide. Service is a big policy or system in a public utility undertaking. In respect of gas, quantity and pressure of supply are factors in service, and so later are inspection and maintenance. Mr. Smith holds that for nothing like the £7542 per annum would it be possible to offer the consumers such a degree of satisfaction by any system of inspection and maintenance of appliances. There are 96,889 consumers on the district, and £7542 is equal to 1s. 6½d. per annum per consumer. We agree with all that; but there is a great deal of dissatisfaction in gas-supply districts, and it is not all due to inadequate pressure. We have a well-authenticated notion that some of it is to be found in the condition of the appliances in consumers' houses.

The Railway Road Transport Bill.

GUIDED by public policy, the Joint Committee of both Houses of Parliament who have been considering the road transport measures promoted by the four great Railway Companies and the Metropolitan Railway Company have passed their preambles with the exception of that of the Metropolitan Railway Company—this probably because it clashes with the Committee's determination to exclude the London traffic area within the Administrative Area from the operations of all the Bills. This result issues from listening to arguments and evidence for and against the measures over thirty-three sittings. There is little question that the Railway Companies had initially

and throughout, from those who have thoroughly examined the question, the fullest sympathy; and the Committee's decision is regarded as an act of justice, although at the same time it was considered right that the new powers should only be granted with conditions attached. The Railway Companies rather expected this; and, in fact, at various stages of the proceedings offered that certain new privileges should be conditional. Among the restrictions is the recommendation that the Ministry of Transport should promote a Bill which will govern the circumstances under which traffic will be carried on throughout the country, bring the power of the licensing authorities into uniformity with modern traffic regulations, and give them powers to impose conditions as to fares, and take into account the inadequacy of the existing services, and the conditions of the streets and roads. The Ministry of Transport will find that the Joint Committee have not been unmindful of the usefulness of suggestions as to the views they formed during the long and exhaustive inquiry. There is to be restriction of possible competition with statutory traffic undertakings of local authorities; the competition will be free and open with private undertakings, though they be statutory ones. If private statutory undertakings are to be subject to competition, then we hope the conditions that are applied in respect of municipally administered undertakings will not be too severe. If there are allegations to the effect that the new privileges are being abused by the Railway Companies, the Minister of Transport will have power to inquire and report upon them. While no one really thinks the Railway Companies will be able to create a monopoly in road traffic, it is considered that they will by the new powers be able materially to assist agriculture and other industries with works situated in isolated places. We should imagine, however, that if the Railway Companies are now to be in the position to offer terms for combined road and rail traffic which will be attractive to some of our heavy industries, it will be well to get installed, among the conditions governing them, protection for the underground property of statutory undertakings. Big tonnage traffic is not found to be always good for its continued integrity.

Efficiency of Coal Utilization.

A SHORT time ago reference was made in the editorial columns of the "JOURNAL" to the greater volume of work that is done, or production that is secured, per ton of coal through the greater efficiency which science has shown us how to achieve in coal utilization. The consequence, of course, is that the consumption of coal bears nowadays a very different relationship to the return of work. The "Iron and Coal Trades Review" has since called attention to the same subject, and points out, as being the most significant factor of all those involved in the coal question, that since 1913 the world's coal consumption has tended to show no decided movement either upwards or downwards. This is partly due to the condition to which we have alluded—that more work is got from the same amount of coal—and not entirely to the fact that the increased requirement for energy is met by water power and oil fuel. We must give every credit to the improvement brought about in the scientific development of coal use. Consider that, in the case of some vertical retorts with steaming, the volume of gas, though not the calorific value, is double what it used to be within the memory of some of us. Even if we assume that the average output of the vertical retort is 50 p.ct. greater than the old 10,000 c.ft. per ton horizontal retort, and that we produce more in thermal value than before, such factors make a great difference in the consumption of coal for gas making. Although gas consumption increases at the rate that it does, we do not require more than about 17 million tons of coal in the British gas industry. All the great difference in the consumption of gas is therefore made up by the improvement of production efficiency and the quantity of water gas made. Our contemporary calls attention to the fact that 20 years ago it took 18½ lbs. of coal to generate a unit of electricity; while in 1926 the average consumption was 2·53 lbs. per unit, with the best individual result at 1·51 lbs. per unit. In Great Britain the average fell from 3·47 lbs. in 1918 to 2·53 lbs. in 1925; in the United States the average in 1926 was 1·95 lbs. The present electrical power of Great Britain requires 8 million tons of fuel per annum; twenty years ago the same output would have required 50 million tons of coal. We know, too, and have previously referred to, the improvement of efficiencies in boiler and furnace working.

Carbon Monoxide Data.

THE Nineteenth Report of the Gas Investigation Committee, which was presented to the Institution this year, and which comprehends the work of Mr. James W. Wood, M.Sc., A.I.C., and his staff, deals with the production of carbon monoxide from gas-burning apparatus; and it should be extremely useful to the gas industry generally. We know that coroners, a small percentage of medical men, and newspaper correspondents, have got an idea that the main function of a gas-flame is to produce carbon monoxide, while, as a matter of fact, their own motor cars produce a great deal more than an assembly of many gas-flames. To deal with people who hold extravagant views, it is well to have authoritative data regarding different types of apparatus, and showing the actual production of carbon monoxide; and herein is the value of this particular report. The research has been specially devoted to free-burning flames of both the luminous and bunsen types; and it has been clearly demonstrated how minute are the quantities of carbon monoxide generated by flames of that kind burning in typical gas appliances under normal conditions of use. The luminous flame is quite as good in that important respect as the non-luminous flame, while, of course, it retains the advantage that it can be burned very low without lighting-back. The geyser, of course, owing to its condition of use, often in a small and badly ventilated room, has been the chief object of attack; and yet it makes enormous headway in popularity owing to its usefulness and safety when properly fixed and ventilated. In the report the efficiency of the geyser is demonstrated, together with the fact that it produces very little carbon monoxide. But it should be noted that there is a limit to the amount of gas which can be burned in it with safety, and that the carbon monoxide production rises very rapidly when that limit of capacity has been reached. The Nineteenth Report and the work of Mr. Wood are of great practical benefit to the industry.

Labour and Official Salaries.

SOME time ago we were talking to a Labour representative in one of the corridors of the House of Commons on the subject of the day when Labour will (or is expected to) rule industry, and as to what would then happen. The question was put, "We suppose in those days you will pay the brains and technical ability which promote and direct your business the same as the labourer?" The reply was, or as near as we dare to publish it, "Do you think we are a lot of fools?" Not long since a scheme was published by labour representatives for the unification and consolidation of the coal industry under the administration of a Board of super men; and the salary named for each was of the order of £10,000 a year. Just lately from a labour quarter comes a proposal for an inquiry into the adequacy of the Speaker's salary, and the inquiry is likely to be not only held, but extended. All this is highly interesting. It shows that among the intellectuals of the labour world the opinion rules that brains and exceptional ability cannot be had without being paid for. But it is a pity that the men who hold these views should congregate only about the seats of central government; though, thank goodness, they are not the men who believe that there is a definite and equal value for all men's services, no matter how much the character and quality of those services may vary. When we come to local government, we often find not only a low appreciation of the market value of the services of the technically trained, but the view that the power conferred by a seat in local government should be utilized

in administering a little bullying to the officials. We see for official positions in some municipal undertakings salaries offered for which no decently technically trained man would undertake the responsibilities. It is an old subject of attack, and it will continue to be so as long as men are in administrative positions who know nothing of the realities of brain values, and who do not realize the importance to their own administration of the services for which they refuse to pay adequately. But we are not prepared to say that this is a universal condition. It is not. We were talking not long since to an official of a council constituted mainly of labour members. He stated that he was well satisfied with his remuneration, and he found the majority of the members "jolly good fellows." The only thing he had to grumble at was that, as the majority of the members could only get to meetings during the evenings, the Committee meetings he had to attend necessitated his time being spent in the council offices, and the remnant in bed at his own home. Saturday afternoon and Sunday were practically the only days on which he could say he had time to call his own. However, there is something to be thankful for in that the labour intellectuals in central government do appreciate that ability should be paid for, and that labour men with diminutive notions on the subject do not universally rule in our local government.

"Field's Analysis" and Costs per 1000 C.Ft.

ON later pages of this issue will be found an article dealing with the new issue of "Field's Analysis." Some interesting tables have been extracted, from which certain illuminating conclusions have been drawn. The work as a whole will be found to be up to its usual standard of excellence; and our compliments are due to the Editor, Mr. H. E. Ibbs, Chief Accountant of the Gas Light and Coke Company, and his staff for the trouble and care taken in its compilation. On looking through the tables, the thought occurs whether the time has not arrived when the costs per 1000 c.ft. could be done away with. Most of us are now so accustomed to the measure of the therm that results stated on this basis are as a rule quite sufficient for every purpose; and it must be felt by many that the older form of expression can never give the true picture afforded by the later and more scientific method. We would even go further, and say that costs given per 1000 c.ft. are in many cases entirely misleading. As this is a matter which will concern almost every gas official, and as we are sure Mr. Ibbs would not like to take the definite step of omitting from his work figures which may, even so, serve some kind of purpose, it would be very helpful if such readers as are interested in this question would give us their opinions on the subject.

The Basic Price Decision.

As is well known in the industry, the favourable decision regarding the basic price and dividend principle of the Joint Committee of the two Houses of Parliament on the South Suburban and Dover Gas Company Bills so altered the position of affairs that it was considered by the Central Executive Board of the National Gas Council that further time was required for discussion in respect of tariff proposals before being finally adopted by the industry. For this purpose, Mr. William Cash was added to the Committee who have this matter in hand. It is hoped to arrange later in the year a general conference for the purpose of discussing the whole question of gas charges.

Coke-Oven Gas Joint Committee.

The formation by the Central Executive Board of the National Gas Council of a Joint Standing Committee with the coke-oven representatives is perhaps timely—certainly the Committee is a strong one. Their duties involve the consideration of matters affecting the business relations between the two industries. But their position is of rather a nebulous kind. They have no real power. They can only discuss and recommend; and they cannot commit an undertaking to any definite policy.

British Stone for British Roads.

This is a subject to which the "JOURNAL" has previously referred. We do not like bitumen instead of tar being purchased and used on our roadways; and people who deal in stone for roads seem to have similar prejudices. Sir Arthur R. Holbrook, M.P., writing on the subject in the "Daily Telegraph," states that, during the first four months of this year, no less than 133,401 tons of foreign stone were imported for use on British roads, and that £167,652 was sent abroad in payment for the material. Many advertisements for contracts ask for quotations to be based on foreign stone. Yet the British road stone quarry owners are in a position to supply at least five times the present demands. Some public authorities state that, by purchasing foreign road stone, they are saving a certain amount in cash. They do not seem to realize that foreign stone is dearer than British, as it has to be paid for twice—once in the usual way, and again in taxes to provide relief for the British unemployed. Sir Arthur's point of view is that "the policy of purchasing foreign material when British material is available is a short-sighted one, particularly at a time of acute unemployment."

Benzole Distribution.

We know what a small quantity of benzole is exported from this country (in the first five months of this year, it only amounted to 781,617 gallons). The President of the Board of Trade recently gave Parliament other interesting figures. The retained imports of benzole in 1927 amounted to 13 million gallons. The National Benzole Association estimate that the production in this country in that year amounted to approximately 26,000,000 gallons of refined benzole. The exports in 1927 amounted to 2 million gallons. Thus the home consumption in 1927 might be estimated at some 37 million gallons, and of this amount nearly two-thirds were produced in this country.

Lord Aberconway Satisfied.

Presiding at the annual meeting of Messrs. John Brown & Co., Ltd., at Sheffield, Lord Aberconway spoke in optimistic terms of the excellent effect of the Five Counties Coal Marketing Scheme on the export trade of the country. The coalowners in Northumberland and Durham who are losing their export coal business are not in agreement with Lord Aberconway, seeing that the subsidized coal from the Humber ports has caused the quantity of overseas business from farther North to shrink considerably. However, his Lordship regards the coal-marketing scheme as the finest thing ever attempted by a trading organization in this country. He thinks it deserves to succeed. Last year the whole tonnage from the Humber was rather more than 2,500,000 tons. In May this year, aided by the scheme and the subsidy, they had contracts forward for no less than 2,000,000 tons—nearly as much as the whole of the contracts for last year. He regards this as a satisfactory sign that the scheme is going to succeed. But we do not overlook the price other coal consumers are paying in order to provide the subsidy. There is not much advantage in selling profitless coal.

Unfettered Membership, but—

As a result of a meeting between representatives of the General Council of the Trade Union Congress and of the colliery owners of Nottinghamshire, the latter have emphasized their previous declaration that they make no inquiry or discrimination with regard to a man's employment and as to his membership of any trade union. With regard to the claim that recognition should be given to the Nottinghamshire Miners' Association, the coalowners feel unable to make any departure from their present arrangement—to recognize only the parties with whom the agreement was entered into.

City and Guilds of London Institute Programme.—There has been published by John Murray, Albemarle Street, W., at the price of 3s. 6d. net (by post 4s.), the programme for the session 1928-29 of the Department of Technology of the City and Guilds of London Institute. Intending candidates will find in it the general regulations and syllabuses for the examinations, and such other information as they may require.

PERSONAL.

The duties of Secretary and Treasurer to the North British Association of Gas Managers have been taken over by Mr. ARCHD. KELLOCK, of the Gas-Works, Airdrie.

Among those recently elected to membership and associate membership of the Institution of Chemical Engineers are Mr. JOHN WILLIAM BROWN, of the Barbados Gas Company, Ltd.; Mr. ALEXANDER JOHN AMBROSE, A.S.T.C., of the Manly Gas Company, Australia; Mr. RONALD STUART ANDREWS, B.Sc., of the Metropolitan Gas Company, Melbourne; and Mr. THOMAS WESTTHORP, of the Langley Park Coke and Bye-Products Works, General Secretary of the Coke Oven Managers' Association.

SIR ARTHUR DUCKHAM TO LEAD THE ECONOMIC MISSION.

The announcement of the appointment of Sir Arthur M. Duckham, K.C.B., as leader of the Economic Mission to Australia was made recently in the House of Commons by Mr. Amery. Sir Arthur is so well-known to all those interested in the fuel industries that the latter may be permitted, perhaps, to take his appointment to this very important position in some measure as a compliment to themselves. The Mission sails towards the end of August, and will be absent from England for upwards of five months. Their task will be an onerous one, as may be judged from the terms of reference, which are as follows:

> "To confer with the Commonwealth and State Governments, with the Development and Migration Commission, and with leaders of industry and commerce in Australia on the development of Australian resources and on any matters of mutual interest to Great Britain and the Commonwealth, which may tend to the promotion of trade between the two countries and the increase of settlement in Australia."

In the course of a recent interview, Sir Arthur Duckham said: "It is impossible for me to express opinions of real value until the Mission has had the opportunity of studying Australian problems *in situ*. There will be, I am sure, many lessons which we shall be able to learn from Australian methods and practices; and the main work of the Mission will resolve itself into the preparation of recommendations which will enable a closer collaboration between the Governments of this country, of the Commonwealth, and of the States which make up the Commonwealth. There is no doubt that one of the most important considerations will be the development of inter-Imperial trade; and in due course the manufactures of Australia in common with the manufactures of other parts of the Empire will enable a volume of inter-Imperial trade to be maintained annually, alongside which our present figures would sink into insignificance.

"My colleagues of the Mission are Sir Hugo Hirst, Bart., whose name is, of course, a household word in the electrical world; Sir Ernest Clark, K.C.B., a Director of the Underground Railways, whose distinguished services in Northern Ireland are still fresh in the public memory, and Mr. Dougal Malcolm, whose knowledge of South African conditions as well as conditions in this country will enable him to bring broad comprehension to the consideration of Australian problems and to the task of improving Anglo-Australian trade. I feel that the Mission presents the opportunity to undertake work of high Imperial importance, and I am more than proud to be able to undertake the duties."

Sir Arthur will be accompanied by Lady Duckham and their daughters and son; and they are hoping to pay a visit to New Zealand when the main work of the Mission has been completed. They will carry with them the felicitations and good wishes of the whole gas industry.

UNIVERSITY OF LEEDS.

DEPARTMENT OF COAL GAS AND FUEL INDUSTRIES.

Examination Results—June, 1928.

From Prof. J. W. Cobb, C.B.E., B.Sc, F.I C., the Livesey Professor, we have received the following list of results of the examinations recently held in the Department of Coal Gas and Fuel Industries.

Gas Engineering.

M.Sc.

J. N. Hazeldon, B.Sc., for a thesis on "Investigations on Low-Temperature Carbonization."

B.Sc. (WITH HONOURS).

First Class.

J. H. Dyde, B.Sc., for a thesis on "The Effect of Ash Constituents on the Behaviour of Carbonized Fuels in the Open Grate."

J. J. Priestley, B.Sc., for a thesis on "The Effect of Ash Constituents of Coal on the Evolution of Sulphur during Carbonization."

Second Class.

W. Etheridge, B.Sc., for a thesis on "The Effect of Ash Constituents of Coal on the Evolution of Nitrogen during Carbonization."

B.Sc. (ORDINARY).

A. H. Eastwood.
S. Kellett.

DIPLOMA IN GAS ENGINEERING.

R. Maxwell.

ELECTRICITY SUPPLY MEMORANDA.

AMONG the papers read at the meeting of the Incorporated Municipal Electrical Association was one by Lieut.-Col. W. A. Vignoles, the newly appointed Director of the Electrical Development Association. The subject was "Selling More Electricity for Domestic Purposes;" but, at the same time, and quite appropriately, it made claims to larger consideration for the "E.D.A." by the electricity supply industry. He made the introductory point that while, under the 1926 Act, the Central Electricity Board had taken over the problem of electricity generation, so far as the maintenance of supply is concerned, the utilization of the plant to the best advantage would depend on the success of undertakings in developing business with a good load factor. The new condition with regard to production and sale raised the question as to how best to distribute the amount paid for kilowatts and the undertaking's own costs. The price to be charged must bear some relation to the cost; and, in Col. Vignoles' view, the only way to obtain this is by a two-part tariff. His suggestion therefore is that all undertakings should adopt a two-part tariff, with an alternative flat rate kept at a comparatively high figure—say, 6d. to 8d. per unit. Referring to the development which has taken place in domestic electrification, Col. Vignoles says that a return obtained by "E.D.A." showed that in 248 undertakings upwards of 55,000 cookers and 237,000 fires were "in use" at March, 1927. The increase in the number of cookers as compared with the previous year was 57 p.ct., while the increase in the number of fires was 32 p.ct. He claimed that these figures represented only a proportion of the apparatus actually in use; and there is probably a large amount of apparatus connected of which the undertakings have no record. We are not sure whether "large amount" is strictly accurate. Col. Vignoles took 1500 KW.-H. as the average consumption for cookers, which from our knowledge of the extent of the disuse of some of them seems rather high as an average; and at that figure the 55,000 cookers would represent a consumption of 82 million units per annum, which, at an average price of 1d. per KW.-H., would bring in a revenue of £340,000 per annum. While this figure appears substantial, 55,000 cookers in the areas indicated means that only 6 p.ct. of the consumers are using electricity for cooking purposes; and as the average number of consumers in the areas reporting amounted to only 20 p.ct. of the total number of assessments, the total number of cookers probably represents only 1·2 p.ct. of the houses in the area. Wiring and slot meters are considered by the Colonel as factors in the situation; and he holds the opinion that undertakings should consider the provision of cookers on hire purchase.

Cooker Achievement and the Lines to be Pursued.

So much for achievement. Col. Vignoles is anxious in the same connection for the financial fortification of the "E.D.A.;" and he makes no secret of the position. To do so is not the best way of amplifying it. The work of the Association, the Director says, is restricted by its revenue, which at present amounts to some £30,000 in a normal year, of which £20,000 is provided by the supply undertakings. Inasmuch as the capital invested in electricity supply undertakings is at the present time about £300,000,000, the £20,000 subscribed by the undertakings cannot be said to be lavish. A change has been made in the administration of the Association. While the work will continue to be directed by the Council, Area Sub-Committees have been established in six provincial areas—viz., Scotland, North-East Coast, North Midlands, North-West, South Midlands, the South-West, and London and Home Counties are worked from headquarters. These Committees are representative of the membership in the areas in question. It is proposed to consider the establishment in each area of an "E.D.A." Service Bureau, if desired by the Area Sub-Committee, which, in addition to other work, should include the operations that are carried out at present by the existing Electric Lighting Service Bureaux in Glasgow, Newcastle, and Manchester. A paid officer, with such assistants as might be required, would be appointed in each area to carry out the work of the "E.D.A." under the direction of the Area

£100,000 for Propaganda.

Committee. A further development would be Circles in each town, or in the areas of supply of large undertakings, each comprising in its membership representatives of the supply undertakings, wholesalers, contractors, and manufacturers, with provision for the representation of the Circles on the Area Committees. For commercial propaganda, it can be seen at once that such Area Committees and Circles must be invaluable. In the Association generally, *ad hoc* committees have been formed, each investigating some special line of development in electrical application. In addition to regular Press work, showroom service and window dressing are topics which are receiving attention. The development of poster stations and lecture work is under way. Additional films are being prepared for rental to members. With all this development, Col. Vignoles holds that the revenue of the "E.D.A." should be greater. An additional £20,000 could be obtained if all supply undertakings contributed on the full scale. If that amount was realized, and the manufacturing interests would, as they have done up to the present, subscribe proportionately, the Association would be some way towards securing a revenue of £100,000 per annum, which is the figure Col. Vignoles thinks should be aimed at. On such a revenue really great national work could be done which would, in his judgment, have a decided effect on the fortunes of the industry and of every individual undertaking.

The Unchanging Price.

Sir John Snell has given the Press some details of the electricity scheme for North-West England and North Wales; and, in the course of doing so, he has emphasized what has been found and is necessary, through misapprehension on the part of the public and the Daily Press. It is getting so common to speak of average prices for electricity of 1d. or under per unit that people have been running away with the idea that they will get current for lighting at that price as well as for heating, cooking, and power. Sir John very properly made this emphatic statement: "When I speak of the average price, this must not be understood by the public to mean that those who take electricity only for lighting purposes will get it at that rate. . . . I can say very confidently that those consumers who use electricity for lighting, heating, and cooking, apart from other uses, may look forward to the time when they will get it at 1d. or less." We cannot see that there is anything wonderful in these prices. There are areas that are now getting lighting units at 3d. and 4d.; and many that are able to buy for heating, cooking, &c., at 1d. per unit. To such areas, the new scheme means nothing.

The N.W. Scheme.

This is the fourth of the schemes prepared by the Commissioners for the Central Electricity Board. The area in this case is 9082 sq. miles; and the population at the last census was 6,980,925. The area extends from the Scottish Border on the north to the northern boundary of the Central England Scheme, and the county of Radnor on the south; from St. George's Channel on the west to the boundaries of Northumberland, Durham, and Yorkshire on the east. The cost entailed by the scheme is estimated as follows: By the Electricity Board for the erection of the transmission system, £4,834,718; by the undertakers for the erection of new stations and extensions, £4,297,620—together £9,132,338. The Commissioners estimate that in the five years 1930-35 there will be a saving to the undertakers in the area of about £2,780,253, or an average of over £500,000 per annum. It is computed that the full advantages of the scheme can be secured with a saving of about £2,144,762 on capital expenditure up to the year 1934-35 as compared with the expenditure that would be necessary if the present system were continued. After that date it is believed the saving will be progressively greater. It is calculated that the scheme will take five or six years to complete.

Mishaps.

When a failure occurs on a big electricity supply, a large effect is produced. The Shipley supply from the Yorkshire Electric Power Company failed for about an hour on the 20th ult. owing to a temporary breakdown. The tram service on the Bingley, Saltaire, and Baildon Bridge lines discontinued to function. The death of Oscar Barber, who was painting a pole carrying an overhead wire (as reported last week), appears to have been wholly due to a misunderstanding. The cable formed part of the power circuit of the Doncaster Collieries Association. The men were working on a Sunday. The contractor for the painting said he understood from the Engineer (Mr. W. T. Barrow) that the line would be "dead" until the Saturday afternoon; and that he would be notified if the power was to be turned on. Mr. Barrow said his instructions were that the power was to be off until Saturday afternoon; but he had no idea the men would be at work on the Sunday. On June 25, there was an alarming explosion at the East Grinstead electricity works.

PEEBLES' GOVERNORS.

A great deal of interest was shown at the Institution Meeting in the description given by Mr. H. C. Smith, of Tottenham, in regard to Messrs. Peebles' patent pressure-loaded governors which he has used so successfully to bring about that desirable result—equal pressure at all times to all consumers. The interesting feature of the 36-in. station governor is the simple loading arrangement, using the power at hand, of the inlet gas pressure to load the bell, instead of the cumbersome method of weight or water load. The pressure loading has the following great advantages. Very small weights only are necessary to operate the pilot governor which controls the pressure required to load the bell. The gas used for loading is taken back into the outlet or other low-pressure main; and another most valuable feature is that the water seal is practically level both outside and inside of the bell for all pressures, so that a deep bell tank is not required. For example, the conditions for the Tottenham governor are as follows:

> Inlet pressures from holders, 5 in. to 10 in.
> Compressor pressures up to 36 in.
> The outlet pressures to be given by the governor are to be capable of alteration between 4½ in. and 30 in.

In an ordinary governor a 30-in. seal *plus* the travel of the valves means a very deep bell and tank. In Messrs. Peebles' governor the seal is practically level inside and outside the bell for all pressures. The loading too, as Mr. Smith showed, only requires 1·28 ozs. on the pilot governor to produce an inch pressure in the 48-in. main. Thirty inches thus requires only 2·8 lbs., instead of 1800 lbs. by direct load on the bell. The bell is not subject to strains, having balanced pressure inside and outside it.

The other interesting reference to equalization of pressures is in the mercurial district governors, also manufactured by Messrs. Peebles & Co., Ltd., of Edinburgh. In this case the pressure loading is obtained from a small air bell housed in a pillar box at the side of the pavement which also contains pressure gauges and a recording gauge. This allows the governor to be placed at the most convenient spot any distance from the control pillar or under the street where there is heavy uninterrupted traffic. To alter the pressure given by the governor, it is only necessary to alter the weight on the little air bell which moves up and down with the governor bell in response to the demand for gas. This system is rapid and most flexible. Instead of a pillar box, the air holder may be placed in a cellar or office, at the works if necessary; and several of these holders have been placed together under one attendant, the governors being at different parts of the district.

There seems to be no doubt that pressure loading as carried out by Messrs. Peebles is a most valuable aid to distribution questions.

THE COMPLETE RATE RELIEF SCHEME.

An essential part of the Government rating relief scheme is proposals for reform in local government and in the financial arrangements between the Exchequer and local authorities in England and Wales, as foreshadowed by the Chancellor of the Exchequer in opening the Budget. These were issued by the Minister of Health as a White Paper last Friday. The following are among the changes proposed to be embodied in legislation: Through the medium of the Rating and Valuation (Apportionment) Bill, now before Parliament: Agricultural land and agricultural buildings will cease to be rated. Industrial hereditaments will be rated on a rateable value which is to be one-fourth of the net annual value as defined by the Rating and Valuation Act, 1925. Freight transport hereditaments will be rated at one-fourth of what they would pay under the existing law. Relief in respect of railways is conditional on the equivalent of the reduction in rates being used to reduce the freight charges on certain selected classes of goods. As necessary accompaniments of this derating scheme, the Ministry propose a series of administrative and financial changes—viz.: The transfer of the functions of the present poor-law authorities to the councils of counties and county boroughs. The transfer of the functions of the Metropolitan Asylums Board to the London County Council. The abolition of the Metropolitan Common Poor Fund, as the cost of the relief of the poor will be spread over the county through the county rate. A reform in the system of highway administration, so as to reduce the number of highway authorities and distribute the cost of maintenance of the more important highways over the largest administrative units of local government. Abolition of certain existing grants from the Exchequer to local services, and to substitute for these percentage grants an annual exchequer grant in aid.

"FIELD'S ANALYSIS, 1927."

We have received a copy of the above publication, which deals with the analysis and tabulation of the workings of practically the whole of the principal undertakings in the United Kingdom. The "Analysis" appears in its usual form, and will furnish each engineer or management official with the means of comparing the costs of the particular undertaking in which he is interested with those possibly of a large undertaking working under more or less similar conditions.

EFFECT OF THE COAL STOPPAGE.

On examining the contents, one naturally turns to the figures which show the effect the disastrous coal stoppage in 1926 had on the cost of coal for the year 1927. The following table, which deals with the "Net Cost of Coal for 1927" compared with the figures for 1925 and 1926, will be interesting for this purpose; and as it also includes the charges for manufacture, the cost of gas into holder is arrived at:

Cost per Therm Sold.

—	1925.			1926.			1927.		
	Net Coal.	Mfty. Exps.	Total.	Net Coal.	Mfty. Exps.	Total.	Net Coal.	Mfty. Exps.	Total.
Gas Light	2·290	2·331	4·621	2·848	2·590	5·438	2·497	2·628	5·125
Commercial	1·978	2·605	4·583	2·178	2·770	4·948	1·419	3·099	4·518
South Met.	1·795	2·468	4·263	2·414	2·780	5·194	1·787	3·071	4·858
Croydon	2·922	2·210	5·132	3·877	2·377	6·254	3·428	2·266	5·694
Hornsey	3·338	2·011	5·349	4·400	2·012	6·412	2·852	2·081	4·933
Lea Bridge	3 195	2·826	6·021	3·889	2·689	6·578	2·868	2·527	5·395
N. Middlesex	3·428	2·931	6·359	4·550	2·989	7·539	3·390	2·808	6·198
S. Suburban	3·481	2·580	6·061	3·943	2·397	6·340	2·496	3·275	5·771
Tottenham	3·108	2·697	5·805	3·892	2·481	6·373	2·877	3·077	5·954
Wandsworth	2·987	2·778	5·765	3·148	2·883	6·031	2·540	2·918	5·458
Bath	1·847	1·883	3·730	3·690	1·558	5·248	1·636	1·943	3·579
Brighton	3·092	2·315	5·407	3·847	2·535	6·382	2·537	2·543	5·080
Bristol	2·874	1 917	4·791	3·881	1·837	5·718	2·636	2·332	4·968
Derby	1·730	2·304	4·034	2·387	2·370	4·757	1·399	2·583	3·982
Newcastle	1·322	2·234	3·556	2·089	2·087	4·176	0 847	1·984	2·831
Plymouth	2·769	1·507	4·276	2·768	1·643	4·411	3·109	2·174	5·283
Portsmouth	2·896	2·486	5·382	3·504	2·193	5·697	2·335	2·718	5·053
Rochester	3·412	3·208	6·620	3·666	3·616	7·282	2·992	3·155	6·147
Sheffield	1·583	1·410	2·993	2·347	1·398	3·745	1·087	1 638	2·725
Dublin	1·867	3·639	5·506	3·452	2·498	5·950	1·436	3·236	4·672
Birmingham	1·354	2·189	3·543	1·892	1·720	3·612	2·792	2 025	4·817
Bolton	1·272	1·697	2·969	1·418	1·591	3·009	1·714	1·675	3·389
Bradford	1·591	2·543	4·134	1·616	2·684	4·30c	3·441	2·932	6·373
Carlisle	1·408	1·257	2·665	1·523	1·200	2·723	3·058	1·286	4·344
Leeds	1·972	2·075	4·047	2·214	1·758	3·972	3·271	1·958	5·229
Leicester	2·244	1·628	3·872	2·244	1·628	3·872	3·826	1 616	5·442
Manchester	1·632	1·508	3·140	1·906	1·475	3·381	3·769	1·550	5·319
Nottingham	1·350	2·514	3·864	1·333	1·974	3·307	2·349	1·726	4·075
Oldham	1·861	1·887	3·748	1·903	1·739	3·642	3·256	1·804	5·060
Salford	1·657	2·151	3·808	2·004	1·990	3·994	3·605	2·105	5·710
Widnes	0·426	1·740	2·166	1·032	1·753	2·785	3·368	1·873	4·241
Edinburgh	1·832	1·679	3·511	1·886	1·513	3·399	3·575	1·342	4·917
Glasgow	1·639	1·737	3·376	2·030	1·730	3·760	8·110	2·137	10·247
Belfast	2·050	1·372	3·422	1·903	1·340	3·243	3·190	1·222	4 412

From the above figures it will be seen that there was a complete justification for the rapid and heavy increases in the price of gas that took place early in the year. It is interesting to observe that the effect of the stoppage was felt to a less degree in Sheffield than in any other district—perhaps because they are situated so near to the Yorkshire coal-producing area. This is borne out by reference to the figures for Newcastle—another Company situated near a coal-producing area, and showing a cost very little higher than Sheffield.

METROPOLITAN COMPANIES.

The figures of the Metropolitan Companies always command special attention; and, on turning to them, it will be seen that the Commercial Company has the lowest charge so far as the cost of production is concerned, this being due to the low cost of their "Net Coal." With regard, however, to manufacturing expenses apart from the cost of "Net Coal," the Gas Light and Coke Company is the lowest; and, had this undertaking not been so heavily hit with regard to its purchase of American and other foreign coal, to which, on account of its large size, resort to a special degree had to be made, it would be safe to assume that the price of gas in the case of the Gas Light Company would have been lower during the year 1927 than that of the other two Companies forming the Metropolitan group. This assumption will probably be justified when the accounts for the current year are published, and when it will have been seen that the price that has been charged by this Company was the lowest of the three—a position which says much for the efficiency of the management of the Gas Light and Coke Company, and upon which they are to be congratulated.

The following table gives an analysis of the main items making up the total price of gas charged by the Metropolitan Companies:

Cost per Therm Sold.

—	Gas Light.	Commercial.	South Metropolitan.
	d.	d.	d.
Net cost of gas into holder	5·125	4·518	4·858
Distribution charges	2·696	2·355	2·357
Rents, rates, and taxes	0·580	0·537	0·362
Management charges	0·408	0·616	0·522
Other charges	0·460	0·586	0·636
Charges for capital	1·740	1·792	1·497
	5·884	5·886	5·374
	11·009	10·404	10·232

It will be seen from these figures that there is still a marked difference between the Gas Light and Coke Company and the South Metropolitan Company with regard to the charge for "Rates and Taxes" and "Capital." These handicaps to the Gas Light Company are inheritances from a bygone period; but the greater measure of progress in regard to the output of gas registered by this Company during the last decade has done much to mitigate their adverse influence on the price of gas.

GROWTH OF OUTPUT.

Over the undertakings generally the lowest average price for gas was that charged by the Widnes undertaking, with Sheffield and Bath running it closely. It is always interesting to take note of the progress of the industry in regard to the output of gas; and the following figures have therefore been extracted from the "Analysis:"

Gas Sold, 1927.
Increase p.ct. over 1926.

	P.Ct.		P.Ct.
The Gas Light	2·88	Rochester	4·43
Commercial	0·02	Sheffield	3·13*
South Metropolitan	0·60	Dublin	9·09
Croydon	3·89	Birmingham	1·85*
Hornsey	3·49	Bolton	10·78
Lea Bridge	4·38	Bradford	2·29*
North Middlesex	8·01	Carlisle	5·16
South Suburban	4·83	Leeds	5·42
Tottenham	4·66	Leicester	3·43
Wandsworth	2·24	Manchester	2·72
Bath	2·38	Nottingham	7·40
Brighton	3·78	Oldham	6·92
Bristol	2·34	Salford	4·70
Derby	4·17	Widnes	6·38
Newcastle	0·91	Edinburgh	11·96
Plymouth	5·34	Glasgow	0·57*
Portsmouth	4·33	Belfast	6·34

* Decrease.

Of the above undertakings, it will be observed that no less than thirty have had increases; the largest being in Edinburgh, where the increase was very nearly 12 p.ct., and Bolton, where it was nearly 11 p.ct. It should be mentioned that in the case of these two undertakings the year, ending as it did in March, 1927, covered practically the entire period of the coal stoppage. If the output of the whole of the undertakings is taken, the result shows an increase over the previous year of 3 p.ct.; and if the output is compared with a period of five years ago, the increase is no less than 24 p.ct. This is undoubtedly one of the best indications to be found of the healthy state of the industry, and is very encouraging, when it is remembered that during a considerable part of this period the electrical industry has had the advantage of a very large measure of Government support and advertisement.

In connection with this phase of the industry's progress, attention is directed to p. 21 of the "Analysis," in which the following table appears dealing with the sale of gas under the various groups for a period of five years, together with other tables of a highly interesting and useful character.

This table has been extracted for the main purpose, apart

Increase in Gas Sold, P.Ct.

Year.	Gas Light.	Commercial.	South Metropolitan.	Metropolitan Companies.	Suburban Companies.	Provincial Companies.	Dublin.	Provincial Corporations.	Scottish Corporations.
1923	5·08	3·54	3·34	4·94	7·09	6·15	2·80	5·00	1·69
1924	6·49	6·41	6·12	6·37	9·36	5·98	1·17	6·43	3·71
1925	3·80	2·12	0·67	2·73	3·91	4·52	9·88	2·25	Dec. 0·35
1926	2·30	0·82	Dec. 0·46	1·46	4·36	3·51	14·21	3·74	5·04
1927	2·88	0·02	0·60	2·10	4·09	1·57	9·09	4·21	2·49

from the general interest it possesses, of showing particularly the progress of the Suburban Companies and of our friends in Dublin. It is also extremely gratifying to find that, large as the sale of gas already is in the area of the Gas Light and Coke Company, it has apparently by no means reached its limit. The increase in this area continues to show a more healthy activity than would appear to be the case in the area of the two other Metropolitan Companies. To what extent this huge concern will eventually grow, it is impossible to conjecture; but at the present moment it has reached a size of no less than one-sixth of the whole of the undertakings in England and Scotland put together.

MAXIMUM DAY'S OUTPUT.

The year 1927 was a remarkable one with regard to the maximum day's outputs that were experienced by quite a number of the undertakings dealt with. The following details extracted from the "Analysis" give the names of the undertakings which achieved success in this direction, together with the days' output in each case and its proportion to annual make.

From this it will be observed that in three cases the proportion of the maximum day's output is very little more than one two-hundredth part of the total output; and this means that, whereas a large maximum day may, on the one hand, be something to congratulate oneself upon, on the other hand a great deal of plant has to be in readiness which may not be fully occupied at other times in order to meet the emergency.

With regard to the number of stoves on hire and the percentage thereof on consumers, it is interesting to note that in the Metropolis the number shows an increase over the preceding year. This is not borne out in the case of either the Suburban or the Provincial Companies, but with Dublin and the Corporations an advance is again shown.

Once more it is our pleasure to recommend to our readers a work which can be no less than a necessity to them if they are desirous of keeping themselves posted in the tendencies of the industry in which they are engaged. What would be the cost in time and trouble to an individual reader of collecting even a tithe of the information which he can secure from "Field's Analysis" for an expenditure of the modest sum of £2 2s.?

—	Maximum Daily Output.	Proportion to Annual Make.
	Thousands.	
Gas Light	225,873	1/17
Croydon	13,574	1/18
Hornsey	3,865	1/24
Lea Bridge	4,181	1/23
North Middlesex	3,401	1/18
South Suburban	17,732	1/18
Tottenham	14,744	1/23
Wandsworth	16,289	1/20
Bath	6,096	1/205
Brighton	10,701	1/21
Bristol	17,290	1/17
Derby	7,582	1/16
Plymouth	7,940	1/19
Portsmouth	11,092	1/19
Rochester, &c.	3,840	1/22
Carlisle	2,202	1/18
Nottingham	12,008	1/24
Edinburgh	14,053	1/24

POTENTIAL INVESTMENTS.

XII.—THE BRIGHTON AND HOVE GENERAL GAS COMPANY.

The Brighton and Hove General Gas Company was founded by Deed of Settlement in the year 1825, and was incorporated by Special Act in the year 1839, and further powers were obtained between that date and the year 1926. The statutory area of supply covers about 60 square miles. The population of the districts supplied is estimated at about 218,000, and there are 58,937 gas services.

The capital of the Company as shown by the last accounts (Dec. 31, 1927) is as follows:

CAPITAL STOCKS.

	£	£
6 p.ct. standard consolidated		357,900
5 " " "		341,880
"B" preference (6 p.ct.) consolidated		100,000
"C" " (4 ") "		10,000
"D" " (6 ") "		
Redeemable 1931	25,000	
" 1933	25,000	
		50,000
		859,780
Premiums received		71,577
Remaining to be issued		97,103
Total amount authorized		£1,028,460

DEBENTURE STOCKS.

	£	£
5 p.ct. perpetual		107,500
4 " "		55,420
7 " redeemable 1930	19,535*	
7 " " 1935	109,380	
		128,915
5½ " " 1937		27,000
		318,835†
Remaining to be borrowed		74,975
Total amount authorized		£393,810

* The provisions of the Statutory Companies (Redeemable Stock) Act, 1915, apply to this issue.
† Premiums amounting to £2317 have been received in respect of part of the stock issued.

Transfer Arrangements: Common form. Fee for registration of transfer, probate, death in joint holdings, marriage, power of attorney or distringas 2s. 6d. All classes of stock (separate deed for each class) are transferable in amounts and multiples of £5. Husband's witness of wife's signature or *vice versa* not accepted. Voting—one vote for every £100 stock (consolidated or preference) up to £1000, one for every £200 beyond up to £2000, and one for every £400 beyond. Directors' qualification £1500 of standard consolidated stock.

Accounts and Dividends: Accounts made up to Dec. 31 and submitted in March, dividends (on consolidated and preference stocks) being paid on or about Sept. 1 and after the annual general meeting. The standard price of gas is 1s. per therm; present price 9⅜d. per therm; declared calorific value 500 B.Th.U. per c.ft. The dividends on the (ordinary) consolidated stocks are subject to sliding-scale—viz., ⅛d. per therm above or below the standard price = 3s. p.ct. per annum in dividend on the 6 p.ct. consolidated stock and 3s. 6⅝d. p.ct. per annum on the 5 p.ct. consolidated stock.

The following table illustrates the progress made by the Company prior to the war and during the past five years. The years 1914 to 1922 are purposely ignored owing to the abnormal conditions then prevailing:

Year.	Average Gross Selling Price of Gas in Company's Principal Area. Per 1000 C.Ft.	Quantity Sold. Thousands C.Ft.	Capital Employed per 1000 C.Ft. Sold.	Gross Profit, after Providing for Income-Tax Balance.	Total Charge for Capital. (*)	Rates of Dividend. P.Ct. per Annum on Original and "A" Ordinary Stocks.	Amount Carried Forward and Balance Reserve Fund.
	s. d.		s. d.	£	£	£ s. d.	£
1903	3 0	1,088,136	13 1	58,639	51,234	10 15 0 7 15 0	68,881
1908	3 0	1,208,825	11 9	54,176	51,507	10 15 0 7 15 0	71,035
1913	2 10	1,414,331	10 0	59,037	51,673	11 0 0 8 0 0	110,466
	Per Therm. d.	Therms.	Per Therm. s. d.				
1923	10·5	9,471,183	1 10	83,724	66,347	11 10 0 8 10 0	116,079
1924	9·5	10,103,753	1 9	76,058	69,161	12 0 0 9 0 0	119,368
1925	9·5	10,589,106	1 9	77,383	71,358	12 0 0 9 0 0	121,590
1926	9·72	10,845,762	1 9	50,629	72,955	12 0 0 9 0 0 On 6 P.Ct. and 5 P.Ct. Stocks.	116,576
1927	10·1	11,255,319	1 10	115,979	75,431	7 7 0† 6 11 9‡	147,331

* The total charge for capital includes dividend and interest paid and amount (if any) carried to reserve fund.
† Equals £12½ p.ct. on old "original" capital.
‡ Equals £9 4s. 6d. p.ct. on old "A" capital.

NOTE.—By a Special Order under Section 10 of the Gas Regulation Act, 1920, made by the Board of Trade on Dec. 10, 1926, the 10 p.ct. (original) and 7 p.ct. ("A") ordinary stocks were converted into 6 p.ct. and 5 p.ct. standard consolidated stocks respectively in the proportion of:

£166⅔ 6 p.ct. stock for £100 original stock and
£140 5 " " " £100 "A" "

The gas sold during the past year shows an increase as compared with the year 1903 of over 200 p.ct.; and the expansion during the past four years, nearly 20 p.ct., indicates that the demand for gas still continues. A remarkable feature of the above record is the decrease in the capital employed, which now stands at 1s. 9·57d. per therm, equivalent to 8s. 11·86d. per 1000 c.ft. as compared with 13s. 1d. twenty-five years ago.

The following table shows the prices of the highest and

lowest transactions on the two ordinary stocks for the past year:

6 P.Ct. Consolidated Stock.

Year.	Transactions. Highest.	Transactions. Lowest.	Dividend. £ s. d.	Yield P.Ct. per Annum on the Average Price. £ s. d.
1927	112	102	7 7 0	6 17 5

5 P.Ct. Consolidated Stock.

1927	100	92⅛	6 11 9⅞	6 16 10

The values of the stocks have risen during the past few months, and on the present average quotations—viz., 117⅛ for the 6 p.ct. stock and 104½ for the 5 p.ct. stock—the yields calculated on the authorized dividends for the current half-year (£3 18s. p.ct. and £3 11s. 5½d. p.ct.) are £6 12s. 9d. p.ct. per annum and £6 16s. 8d. p.ct. per annum respectively.

INSTITUTION OF GAS ENGINEERS' EDUCATION SCHEME.

We have received for publication from Mr. Walter Hole (the Organizing Secretary) the following list of the successful candidates (external) for the Institution's certificates in the recent examinations in Gas Engineering and Gas Supply held under the Education Scheme of the Institution of Gas Engineers. The names of the successful internal candidates will be published as soon as the results of their examinations in ancillary subjects have been received.

GAS ENGINEERING.

ORDINARY GRADE.

Name.	Class.	Ancillary Subjects Taken.
Monson, Gilbert East	1st W.D.*	Maths., Inorganic Chemistry, Organic Chemistry.
Parkyns, Alfred Day	1st W.D.*	Maths., Inorganic Chemistry, Organic Chemistry, Physics.
Cornish, Kenneth Charles	1st	Maths., Chemistry, Physics.
Garner, Leonard Francis	1st	Maths., Inorganic Chemistry, Organic Chemistry, Physics.
Grealey, Patrick	1st	Maths., Inorganic Chemistry, Physics.
McCaskill, Douglas Napier	1st	Maths., Inorganic Chemistry, Physics.
Neil, George	1st	Maths., Machine Drawing, Mechanics.
Nicholson, Alan Hetherington	1st	Maths., Inorganic Chemistry, Physics.
Reed, Charles Arthur Edward	1st	Maths., Machine Drawing, Mechanics, and Heat Engines.
Santler, Frank Walter Ring	1st	Maths., Machine Drawing, Heat Engines.
Sullivan, Harold Denis	1st	Maths., Chemistry, Physics.
Wakeford, John Ellis	1st	Maths., Inorganic Chemistry, Physics.
Frith, Edward Railton	2nd	Maths., Chemistry, Physics.
Hallas, L. E. W.	2nd	Inorganic Chemistry, Organic Chemistry, Physics.
Hallsworth, Stanley	2nd	Maths., Chemistry, Physics.
Hawkings, B. G. H. J.	2nd	Maths., Inorganic Chemistry, Organic Chemistry.
Haworth, Wilfrid	2nd	Maths., Machine Drawing, Mechanics, and Heat Engines.
Hoadley, Edward John	2nd	Inorganic Chemistry, Physics, Mechanics.
Johns, William Henry Thomas	2nd	Maths., Chemistry, Physics.
Martin, Cyril Sherwood	2nd	Maths., Chemistry, Physics.
Marwick, John Adam	2nd	Maths., Machine Drawing, Mechanics, and Heat Engines.
Parton, Arthur	2nd	Maths., Inorganic Chemistry, Organic Chemistry.
Proctor, Charles Arthur	2nd	Maths., Inorganic Chemistry, Organic Chemistry.
Soanes, F. R. W.	2nd	Maths., Chemistry, Physics.
Staniforth, Claude Bertram	2nd	Inorganic Chemistry, Organic Chemistry, Physics.
Suttle, Harold Kershaw	2nd	Maths., Chemistry, Physics.
Tiddy, K. E. E.	2nd	Maths., Inorganic Chemistry, Organic Chemistry, Physics.
Richardson, James	2nd	Maths., Chemistry, Physics.
Wallace, W. D.	2nd	Maths., Chemistry, Physics.

HIGHER GRADE.

Name.	Class.	Ancillary Subjects Taken.
Brown, John Joseph	1st	Maths., Chemistry, Physics.
Kirkhope, John	1st	Maths., Inorganic Chemistry, Organic Chemistry, Machine Drawing, Mechanics.
Saunders, Alfred George	1st	Maths., Chemistry, Mechanics, and Heat Engines.
Armour, John	2nd	Maths., Chemistry, Physics.
Caesar, John Ernest Victor	2nd	Maths., Inorganic Chemistry, Organic Chemistry, Physics.
Chilcott, John Aubrey	2nd	Physical and Organic Chemistry, Engineering Drawing and Machine Design, Engineering Science.
Gallagher, Peter	2nd	Maths., Chemistry, Physics.
Johnson, Charles	2nd	Maths., Chemistry, Physics, Mechanical Engineering.
Jones, Stanley	2nd	Maths., Chemistry, Physics.
Lowe, Frank	2nd	Maths., Chemistry, Physics.
Millett, Horace David Victor	2nd	Maths., Chemistry, Engineering Science.
Pepper, Richard John	2nd	Inorganic Chemistry, Organic Chemistry, Engineering Science, Chemistry of Gas Manufacture.
Pye, James William	2nd	Maths., Machine Drawing and Heat Engines, Mechanics.
Roberts, John	2nd	Maths., Mechanics, Building Construction.
Smith, Charles Edward	2nd	Maths., Inorganic Chemistry, Practical Chemistry.
Webster, John	2nd	Mechanics, Mechanical Engineering, Building Construction.
Barrow, Walter Cecil	2nd	Inorganic Chemistry, Organic Chemistry, Physics.

DIPLOMA.

Name.	Class.	Subjects of Theses.
Grayston, John	1st W.D.*	The Formation and Elimination of Tar Emulsions.
Summerson, Roy	1st W.D.*	Exhausting and Governing Gas from Retorts.
Sylvester, Frank Courtney	1st	Some Aspects of the Working of Internal Producers, with Suggestions for Improved Efficiency.
Hyslop, James Leggatt	2nd	Vertical Retort Installations. Notes on Design, Construction, and Working.
Ineson, Wilfrid Illingworth	2nd	Purification of Coal Gas.
Kendrick, Harold Bunce	2nd	The Probable Advantages to be Derived from Mechanically Agitating Coal in the Upper Portion of a Vertical Retort.
Winch, Egbert Harold	2nd	Some Notes on Wet and Dry Purification, with Particular Regard to Temperature Control.

NOTE.—The Diplomas were presented to the above successful candidates at the recent Institution meetings at Cardiff.

* W.D. = With distinction.

GAS SUPPLY.

ORDINARY GRADE.

Name.	Class.	Ancillary Subjects Taken.
Beech, Raymond	1st	Maths., Chemistry, Physics.
Cooper, James Edward	1st	Maths., Mechanics, Machine Drawing.
Elliot, Alan William	1st	Maths., Machine Drawing, Engineering Science.
England, Arnold	1st	Maths., Chemistry, Physics.
Harrison, Louis William	1st	Maths., Mechanics, Machine Drawing.
Kleist, Leslie Leonard	1st	Maths., Mechanics, Machine Drawing.
Marshall, James Saddler	1st	Maths., Machine Drawing, Heat Engines.
Nichols, Frederick	1st	Maths., Chemistry, Physics.
Pryce-Jones, C. F.	1st	Maths., Chemistry, Physics.
Quiller, Wilfrid Richard	1st	Maths., Chemistry, Physics.
Ross, Louis Alfred	1st	Mechanics, Machine Drawing, Heat Engines.
Smith, William Patterson	1st	Mechanics, Machine Drawing, Heat Engines.
Armour, John	2nd	Maths., Chemistry, Physics.
Benson, Donald	2nd	Maths., Mechanics, Heat Engines.
Collinson, Archie	2nd	Maths., Chemistry, Physics.
Eccleshare, Kenneth George	2nd	Maths., Physics, Mechanics.
Fairbank, William	2nd	Maths., Machine Drawing, Mechanics and Heat Engines.
Haddon, George Edward	2nd	Maths., Chemistry, Physics.
Hopkinson, Stanley	2nd	Maths., Mechanics, Heat Engines, Machine Drawing.
Huntley, Thomas	2nd	Maths., Machine Drawing, Mechanics.
Johnston, Harry	2nd	Maths., Physics Mechanics and Heat Engines.
Kershaw, Robert William	2nd	Machine Drawing, Mechanics, Heat Engines.
Stoddart, Charles Easton	2nd	Maths., Physics, Mechanics and Heat Engines.
Walker, Maurice	2nd	Chemistry, Mechanics, Heat Engines.
Williams, J. Harold	2nd	Maths., Chemistry, Physics.

HIGHER GRADE.

Name.	Class.	Ancillary Subjects Taken.
Greaves, Ralph Lincoln	1st	Mechanics, Machine Drawing, Heat Engines.
Brown, K. E. B.	2nd	Mechanics, Machine Drawing, Heat Engines.
Duncan, Thomas Moncur	2nd	Mechanics, Machine Drawing, Heat Engines.

DIPLOMA.

Of the three candidates for the Diploma in Gas Supply, none fully satisfied the Examiners, although one did so remarkably well in both the written and oral portions of the examination that the presentation of a suitable thesis next year is all that is now required of him.

WAVERLEY ASSOCIATION OF GAS MANAGERS.

ANNUAL MEETING AT PEEBLES.

The Annual Meeting of the Association was held in the Chambers Institute, High Street, Peebles, on Friday last, June 29. Mr. G. URQUHART, Tranent, presided.

A CIVIC WELCOME.

Provost GEORGE ANDERSON (Peebles) at the outset addressed a few words of welcome to the members. He said that if the gas industry wanted to maintain the consumption of gas, they must do all they could to bring down the cost. At the present time they were installing vertical retorts in Peebles. The purpose of this, of course, was to reduce the cost of the production of gas and to increase, if possible, consumption. As a result of what they were now doing, he believed they would be able for many years to maintain their position against electricity. Electric cables had been laid from Galashiels; and in Peebles electricity had been installed in many of the shops and private houses. So far, however, they had not considered the possibility of using it for street lighting. In Peebles they had what he considered a good system of street lighting; and he never heard any complaints in regard to it. Recently the County Convener of Peeblesshire had made a strong plea for giving engineers and public officials a free hand. He readily agreed—with the qualification, of course, that they must be worthy of that confidence. If engineers and gas managers proved that they were doing their very best, then the confidence that had been spoken of by the County Convener would be freely given.

The PRESIDENT said they were indebted to Provost Anderson for his presence, and for his words of kindly welcome.

THE ACCOUNTS.

The PRESIDENT directed the attention of the members to the abstract statement of the income and expenditure, which was, he thought, most satisfactory.

Mr. A. KELLOCK (Airdrie), moving the adoption of the balance-sheet, said he felt they ought to congratulate the Secretary and Treasurer (Mr. R. J. Philp) on the happy financial position of the Association. For a long time it had been the ambition of Mr. Philp to have a sum of £100 to the credit of the Association. This had now been achieved; and they must congratulate Mr. Philp upon the splendid work that had been done.

Mr. J. RICHMOND (Penicuik) seconded; and the statement was unanimously accepted. It showed that a sum of £100 had been invested in 5 p.ct. War Stock, while there was, in addition, a small balance in the hands of the Treasurer.

NEW MEMBERS.

The following were admitted to membership:

Ordinary Members.

Mr. David Fulton, Helensburgh.
Mr. A. Cuthbert, Grangemouth.
Mr. E. Robinson, Annan.
Mr. Daniel McIntyre, Montrose.
Mr. A. Arnot, Langholm.
Mr. J. Letham, Leslie.
Mr. J. K. Simmonds, Moffat.

Extraordinary Members.

Mr. H. Stoney, c/o Messrs. Wilsons & Mathiesons, Ltd., Glasgow.
Mr. R. O. Robson, Thermal Syndicate, Ltd., Wallsend-on-Tyne.
Mr. A. Pollard, Leeds.
Mr. J. M. Adams, Glasgow.
Mr. C. B. Tully, Glasgow.
Mr. Gardiner, Milne's Meter Company, Edinburgh.
Mr. Boyd C. Workman, Saltcoats.
Mr. John Cadderson, Paisley.

MR. COWIE'S MOTION.

The PRESIDENT said the next item was consideration of the motion standing in the name of Mr. R. W. Cowie, of Hawick. The proposal was: "That the Committee of Members in general meeting assembled may appoint a President or members of Committee from ordinary members of the Association, whether they be at the time resident in the Waverley District or not."

It was decided that, in the absence of Mr. Cowie, the motion standing in his name must drop.

RULES OF THE ASSOCIATION.

The PRESIDENT said they came now to the following motion, which was put forward by the Committee: "Rule 8, after 'three to form a quorum':

"The Committee may recommend a manager outside the Waverley district, and who is a member of the Association, to be President."

Mr. R. HAMILTON (Dalkeith) said he had pleasure in moving the adoption of the Committee's recommendation. The subject had received most careful attention; and he believed Mr. Cowie himself would have recognised now that this proposal of the Committee was the better one.

Mr. DAVID VASS (Perth) seconded the proposal, which he believed would be of great assistance in upholding the prestige of the Association. He anticipated that there might possibly be objection because of Rule 1, which read: "The Association shall be called the Waverley Association of Gas Managers, as at present, and shall be confined entirely to the Waverley district, as hitherto." If that rule was to be interpreted as meaning that membership should be confined exclusively to managers in the Waverley area, he had to point out that it had been broken long ago. He rather interpreted that rule, however, as meaning that the meetings of the Association would be confined to the Waverley district. The Association now had a great many members who were not managers in the Waverley area. The rule now submitted by the Committee did not mean that every year the choice of a President from an outside area was to be made. What was desired was that the Association should have an influence and a weight in the gas world; and he believed this could best be secured by the occasional nomination of some one outside as President.

Mr. JOHN O'HALLORAN thought that the last sentence of Rule 1 would require now to be deleted.

Mr. A. DOW (Galashiels) was afraid there were other rules which were being broken. The rules were somewhat anti-

THE PRESIDENT,

Mr. G. Urquhart, of Tranent.

quated; and it ought to be an instruction to the Committee to have them carefully revised and amended.

Mr. DOW formally moved that it be a recommendation to the Committee to revise the rules and bring them forward for consideration at next year's meeting.

Mr. RICHMOND said he would second Mr. Dow's motion, if the latter would approve of the proposal now made by the Committee.

Mr. FULTON asked if it was possible to amend Rule 8 without in the first instance altering Rule 1. Personally, he felt it would be very unfortunate if the Association should decide to seek its President from outside its own area. As the Waverley Association, the Association had individuality and character. The proposal was a suggestion of weakness—no more and no less.

The PRESIDENT said it was clearly the intention of the Association to draw upon its own members in filling the Presidential Chair year after year.

The SECRETARY said the Committee wanted power, if they could not appoint a President from their own district, to go outside. They would never think of going outside every year. It would be only occasionally.

Mr. A. MACDONALD (Prestonpans) thought that Mr. Fulton had fairly expressed the viewpoint of some at least of the members. His own opinion was that the Association should remain as a Waverley Association. He moved an amendment that the Association should remain a Waverley Association as at present.

The motion of the Committee was carried by a large majority; only two voting for the amendment—the mover and the seconder (Mr. Walsh).

After further discussion it was agreed that the Committee should revise the constitution and rules. The proposed new

rules will be printed in draft form and submitted for approval at the next annual meeting of the Association.

Election of Office-Bearers.

The President announced that the Committee had agreed to put forward Mr. Jamieson, of Edinburgh, as President for next year. They could not do better than re-appoint their good friend Mr. Philp as Secretary and Treasurer.

Messrs. Dow (Galashiels) and Chalmers (Kelso) were elected members of the Committee; and the re-appointment of Mr. John O'Halloran as Auditor was confirmed.

PRESIDENTIAL ADDRESS

of Mr. George Urquhart, Tranent.

I have to thank you for the honour you have conferred upon me in electing me to the high office of President of your Association—an honour which I appreciate the more when I realize that this is the oldest established Association connected with our important industry. It was founded in the year 1861. Technical knowledge was not so easily obtainable in those days as it is now. Progress depended principally on the pooling of experience and knowledge; and I have no doubt many interesting and informative discussions took place. It is nice to think that to Scottish gas managers the idea of forming a gas association was suggested; and it is particularly pleasing that it was confined to managers of the Waverley district, stretching as it does from the Forth to the Tweed. Still, when one remembers that the inventor of gas was a Scotsman, and when one considers the important part which Sir Walter Scott took in the Edinburgh Oil Gas Company, being its first Chairman, it is not surprising that the Waverley area of Scotland should take the initiative in the formation of gas associations. I am sure we are all pleased with the record of the Waverley Association; and I sincerely hope it will continue to bear its share in the good work which the many gas associations in existence to-day are doing.

In selecting a subject for my address, I decided I could not do better than outline my experience in connection with the extensions and developments of the undertaking under my charge. When I took over the management of Tranent, I found the plant and building in a very bad condition. The financial position of the undertaking caused my Directors serious concern; and altogether the prospects were not encouraging, particularly when we were faced with competition from electricity.

Carbonizing and other Plant.

The carbonizing plant consisted of a bench of horizontal retorts with two ovens, one with five retorts, and the other with three, each heated on the regenerative principle. The retorts had reached the limit of their useful life; and we were faced with the very serious problem of how repairs were to be effected without an interruption in the supply. The hydraulic main was out of level, and badly pitched, and the flushing arrangement defective; and it was evident that this matter demanded immediate attention. The work of cleaning can be better imagined than described. The end had to be removed and the pitch raked out; and among the deposits we found a piece of 4 in. lead pipe about 16 in. long covered with engine waste, fireclay, and pitch, practically blocking up the main. It had apparently been used for adjusting a dip pipe, and, becoming detached, had dropped into the main.

Only one exhauster was available—a Laidlaw two-blade, belt-driven by a Crossley vertical gas engine. This was in a very bad condition, and could not be depended upon to run two hours continuously.

There are two purifiers, each 8 ft. by 5 ft. by 4 ft. deep, of the water-sealed type; and at the water line there were large paint blisters, which, when removed, showed the plates to be very badly wasted and continuous leakage going on. The covers were held in position by weights placed on the top.

The total storage capacity is 19,000 c.ft.; one holder having a capacity of 14,000 c.ft., and another 5000 c.ft. The tank of the larger holder was badly out of level, on account of underground workings. As with most other small works, leakage was high; but when pipes were opened up, this was not surprising, as both mains and services were in a very bad condition, and were totally inadequate in capacity.

Coal Strike of 1921.

In view of these facts, it was not surprising that the gas supply was subjected to strong public and Press criticism, often unfair and unreasonable; but I did not allow this to act as a brake on my activities. I gradually improved matters at the works, making the best of existing plant, and at the same time regaining the confidence of the consumers, until the coal strike took place in 1921. This to many was a calamity; but to me it was a pleasant relief, as we were compelled to shut-down the plant on account of the difficulty in securing supplies of coal. The coal that was available was useless, on account of the limited plant which we had and its condition. I suggested to my Directors that we should take the opportunity of carrying out the necessary repairs; and it was agreed that we should close-down for five weeks. During this period I had the retorts re-built, the hydraulic main levelled, the exhauster put in good working condition, and new covers fitted on the purifiers, thus preparing for a fresh start. I am of the opinion that the stoppage did us no harm. In fact, I believe the want of gas did more to popularize it than any Press advertisement could have done.

At this time we were supplying 4½ million c.ft. per annum; but the district was expanding rapidly, and I could see that something had to be done in the way of extensions. I surveyed the whole position, and estimated that if a good supply of gas was provided the output could easily be doubled. I recommended, after careful investigation, that a complete gasification plant to produce 75,000 c.ft. of gas per day should be put down, to work in conjunction with our existing horizontal retorts; that a new exhauster house should be erected and a new exhauster fitted; and that a new main should be laid from the works to supply the district. Of this scheme my Directors approved; and the plant was put in hand and erected as quickly as possible.

Tully Plant.

The blow is supplied by a Keith-Blackman fan, belt-driven by a 12 h.p. horizontal gas engine; a 9 in. blast main connecting the blower to the primary air valve of the plant. The coal is elevated by a hand winch arrangement to an overhead hopper. The Tully plant itself is of a standard design, and need not be explained. The steam is supplied by a vertical boiler 8 ft. by 4 ft., at a working pressure of 80 lbs. The works being in close proximity to a public school and dwelling houses, it was found necessary to extend the snift stack of the plant and insert it into the chimney of the horizontal retort settings to prevent the discharge of deposits (while the blow was on), causing a nuisance. A cast-iron manhole was inserted at the bottom of the chimney for cleaning purposes.

In view of the limited storage accommodation available, the method of operating the total gasification plant had to be carefully considered, keeping in mind the supply of a gas of a constant quality. I examined two proposals: (1) To connect the outlet of the new plant to the hydraulic main, which could be used as a mixing chamber. The gases passing forward together through the purification plant would then have an opportunity of being well mixed before reaching the holder. (2) To use the small holder of 5000 c.ft. capacity as a relief holder for the total gasification plant, and to admit a definite quantity of this gas to dilute the coal gas from the retorts.

I decided on the latter method. While it was a big sacrifice to part with this holder, I felt that it was better to dilute the rich coal gas than to attempt to carburet or increase the calorific value of the gas from the new plant. If a uniform quality was to be obtained, it was only by this method that it was possible. The new plant being ready, it was arranged to work-down the quality gradually. At first only a small quantity of the new gas was admitted, working slowly up to 20 p.ct. Complaints came in gradually—particularly from consumers with flat-flame burners—but with the increasing demand for gas, I had no alternative but to continue. I personally approached the problem with tact and care, analyzed each individual complaint, and had the cause removed; and very soon the appliances were all adjusted to the new conditions.

Testing and Analysis.

In a small works such as Tranent no facilities are available for testing, and much is done by rule-of-thumb. This point struck me most forcibly during the transition period of changing-over to the mixed gas; and I thought what a help it would have been if I had had a calorimeter and a gas analysis apparatus to make tests, so as to know exactly what was going on. The manager of a small works has neither the appliances nor the time to make such tests, every hour of his time being occupied; but he realizes what a help scientific assistance would be when he is changing-over from an old to a new method of gas production. It has often been suggested that a travelling chemist might find a remunerative business by visiting small works, making analyses, and suggesting improvements; and I certainly feel that, had such a person been available during the change-over, his services would have been of considerable assistance to me.

I may mention that the change-over took place at what was probably the most inopportune time, when everyone was looking to electricity—the Lothian Power Company having commenced operations, and cables being laid down in the district. Much canvassing was done; and, this being assisted by Press publicity, it appeared that my efforts to supply a cheap and plentiful supply of light, power, and heat were to meet with failure. By the aid of the new plant I was, however, able to devote more time to improving the district supply, by making the necessary adjustment of consumers' fittings and appliances. New mains and services were laid, and an ample supply of gas was provided. The sales of gas increased, the complaints grew fewer, and in June, 1925, I found it necessary to suggest further additions to the plant to cope with the demand. By this time the retort bench was in a precarious condition; and I was faced with the problem of providing a new retort house with horizontal retorts, or supplying gas from the total gasification plant direct to the district. I decided on the latter, and recommended that the Tully plant be duplicated, and that this gas be supplied direct to the consumers. I gradually worked-down to

the quality I anticipated could be supplied; and when the duplicate plant was erected, the horizontal bench was shut-down.

During the period in which we were supplying mixed gas, I estimate we were making about 9000 c.ft. per ton of coal gas of about 550 B.Th.U. quality; and when this was diluted with the gas from the total gasification plant, we had a total make per ton of 17,000 c.ft. of 400 B.Th.U. quality. These figures are based on samples sent in a test tube to Edinburgh and analyzed; the quality being a calculated figure.

With the introduction of all-Tully gas, a further adjustment of consumers' fittings had to be made; but this was anticipated, and the change-over was accomplished with but little or no complaint or inconvenience to the consumers. Since then we have continued to supply nothing but gas from the total gasification plant; and during the long coal stoppage in 1926 we were able to furnish an unrestricted supply throughout the whole period.

Method of Working Tully Plants.

It is difficult to lay down any hard-and-fast rules as to the best method of running a plant of this description, as it depends entirely upon the requirements and conditions of each district. What would suit one place might be the cause of complaint in another. Both quality and quantity of gas can be varied according to the class of coal used. The usual quality aimed at is about 360 B.Th.U.; but this can be increased in several ways —such as by withdrawing as much coke as possible from the generator, by the addition of tar or other carburetting material, or by a variation in blow and the steam used. I have found the most economical method of working to be to shake up the fuel bed every two hours and remove all dust. This has the desirable result of reducing trouble from clinker to a minimum. I also withdraw a good deal of coke, as I aim at producing a gas round about 380 B.Th.U. I probably do not have the high production of gas per ton of fuel used that is claimed for this kind of plant; but I have produced a low-grade gas which is satisfactory to my consumers, and it would be folly on my part to sacrifice a satisfied gas-consuming public for the sake of a few extra thousand cubic feet per ton. I do not suggest that I have not supplied gas of a lower quality than this. In fact, one of the samples which I sent for test showed the undernoted result:—

	P.Ct.
CO_2	3·43
Illuminants	2·00
O_2	0·43
CO	30·04
CH_4	9·71
H_2	36·30
N_2	19·09
	100·00

The approximate calorific value of this analysis is 360 B.Th.U.; and at that particular time I was having some complaints. On investigation I could find nothing the matter at the consumers' premises; so that the only other cause could be the quality of the gas. It is rather surprising that it did not affect all consumers; but it affected a sufficient number for me to make my plimsol line 380 B.Th.U., and to keep it a little higher than this if possible. I have a very sensitive burner which acts as a tell-tale; and it is surprising how steady we can maintain the gas with this.

The Tully plant is suitably designed to meet the requirements of a small works, either worked alone or in conjunction with existing retort plant. It also gives the manager the opportunity of developing his district. One very important factor is that the holders can always be full, and the flexibility of the plant enables one to meet any emergency.

Small Works.

What a modern small works should be to-day depends much upon the requirements and conditions under which it has to operate, and also on the market available for the dipsosal of bye-products. What is right in one place may not suit another. In Tranent I had a distinct difficulty in disposing of my bye-products. Coke was a glut on the market; and tar and liquor had to be sent a long way to the distillers' works, with an expensive carriage. This I have no doubt influenced me when I decided on total gasification.

Low-Grade Gas.

I do not intend to discuss the question of high and low grade gas, as it has been debated on many occasions. I think it might now be taken as a fact that a gas below 400 B.Th.U. quality can give satisfaction to the consumer. I do not suggest that low-grade gas can be turned on to any district without careful preparation; but I do feel that, where ample precaution is taken and adequate preparation made, it can be done without much inconvenience to the public.

Street Mains and Services.

Money, however, must be spent on the district. Mains have to be increased in size, and service pipes and meters enlarged, as the low-grade gas should be supplied at no higher pressures than the high grade, and this can only be accomplished with adequate provision in mains and service pipes. I have enlarged many of the mains in my district, and made circuits (where this was possible) with the object of equalizing the pressure. The main street leading from east to west is laid with a monolastic surface. In this particular section my main is small; and it is an expensive matter to break this road. I have delayed this portion, with the object of taking advantage of an opening for electricity or sewage; but so far this has not arisen, and, as most of my complaints now come from this area, I have had to lay a new main to supply into the end of this particular pipe. I have reason to hope that this will get over my trouble and avoid breaking this expensive thoroughfare.

Where new mains are being laid and the subsoil is suitable, I am adopting steel in preference to cast iron. In a mining area this is essential, as, apart from the breakage of cast-iron pipes, the steel pipe being supplied in long lengths there are fewer joints to be troublesome through subsidence. Steel pipe is cheaper to lay; and although the purchase price of the pipes themselves may be a little higher than cast iron, still I find the total cost of laying a main in steel cheaper than in cast iron. If the pipes are properly wrapped and well coated, I see no reason why they should not have as long a life as cast iron. It is important, however, after the joint has been made, that it be thoroughly wrapped and sewn, and coated well with the solution supplied for this purpose.

For service pipes I fit nothing smaller than ¾ in.; and I have replaced practically every service in the old part of the town. In some cases ½ in. iron pipe was found to be supplying two houses; and in but few instances was the service pipe more than ½ in. Where the service pipe is laid in doubtful soil, we either use coated tube or pitch-in the service in a **V** board after being completed. Wherever possible, I supervise all work being done on the district, test the pipes, and satisfy myself that everything is in order before filling in the ground.

We had a very large number of small wet meters; and these I have gradually replaced by dry meters of a larger capacity. This work had to be done over a period of years on account of the costs; but I am glad to say that most of them have now been replaced.

Internal Carcassing.

I also supervise the internal piping of all new building schemes, advise the size of piping (allowing always a sufficient margin for future requirements), and recommend the most suitable fittings and appliances; and I am pleased to say my recommendation is accepted in most cases. In one block of houses recently erected I managed to persuade one of the tenants to instal a wash boiler; and I find this has been a most fruitful source of revenue. The house in question is fitted with a prepayment meter; and many of the neighbours have the use of the wash boiler. They bring their clothes along, with money for the meter; and everyone appears to be satisfied. It occurred to me that a communal washhouse fitted out in this way would be a distinct source of profit for the undertaking; but central premises would be required for this purpose.

I find that, although the miners get cheap coal, their wives prefer to keep a clean fireside by using gas; and my policy is to encourage this as much as possible.

Free Boiling Rings.

At the beginning of the coal strike in 1926, very few of my consumers had a cooking appliance or boiling ring, and gas was principally used for lighting purposes. So I took the opportunity, when coal was difficult to obtain, and then only at ransom prices, to fit free of charge in each consumer's house a boiling ring. These rings were used to advantage; and I estimate that the increased consumption of gas during the strike period fully justified the expenditure. They are still a source of revenue, and likely to continue so. Only about 10 p.ct. of the consumers have cookers; but I hope the day is not far distant when this undesirable state of affairs will be remedied. With this object in view, we have opened-up in our main street an office and showroom where consumers can see up-to-date appliances; and I have no doubt we shall arrange a hire-purchase system so that the public can have modern gas appliances on an easy payment basis. The results so far have been most encouraging, and altogether I am satisfied that the showroom is appreciated by the public, and is an added asset to the undertaking.

Free Carcassing.

There were about 300 miners' houses which had no gas pipes fitted. We approached the colliery company on the matter; but in view of the condition of the coal trade, they were not inclined to go to the cost of carcassing. We even suggested a joint basis, each contributing a share of the cost; but this also was turned down, and negotiations broken off. The occupiers were most anxious to have a supply. In fact, a few of them actually offered to bear the cost themselves. As, however, the question of mains was important, and involved a fair sum of money, we had to decline unless it was to be the whole scheme. Matters drifted for some time, when I recommended that the company should carcass the houses free of charge. This was agreed to, and, after securing the permission of the owners, the work was put in hand.

The houses are of the ordinary miner type, consisting of two

and three apartments; and each apartment was fitted with a lighting point and also a boiling ring connection, which was made sufficiently large to take a cooker, if desired, at a later date. The work was carried out by our own fitters, at an average cost of 25s. a house. The consumption per consumer varies considerably; but the average runs out at 15,000 c.ft. per annum. This, I hope, will increase as time goes on and trade conditions improve; but it is fully up to our estimate. We are still carcassing houses free of initial cost, but under an agreement that the consumers take prepayment meters, and that they pay a higher rate for the gas than the present prepayment consumer. As soon as the cost of carcassing is paid, the ordinary rate for this class of consumer is granted. We have quite a number of houses fitted in this way; and the consumers appear to be perfectly satisfied with the arrangement.

Every little helps; and it is surprising how the place has developed. But there can be no doubt that it has been entirely due to the progressive policy adopted by my Directors. They have undertaken to supply a product of good constant quality, and to give service to the public on the easiest possible terms. They have sacrificed dividends to put the undertaking on a good, sound financial basis; and their policy has been justified. They were faced with competition from electricity, State-aided or subsidized; but this did not shake their confidence in the product they had to offer, and the consumers have confirmed that the policy adopted by them was a correct one, which is fully appreciated.

The number of consumers has increased from 325 in 1922 to 900 in 1928; and I have no doubt we shall soon touch the thousand figure. The consumption of gas during the same period has increased from 4½ million to 13 million c.ft., and the leakage has been reduced from 19 p.ct. to 12 p.ct. While the consumption per consumer might appear low, it must be remembered that we have no large users; most of the houses being small miners' cottages. It should also be remembered that trade conditions during the period in question have been extremely bad. I have no doubt that when prosperous times return to the coal industry the consumption of gas will increase very materially. It may be suggested that the quality of gas is lower now, and that part of the consumption is due to this; but I feel certain, from the condition of the plant, that the gas was no higher in quality in 1921 than it is to-day. While the price of gas in Tranent may be high, it is comparable with most undertakings of its size.

Futility of Comparison Without Analysis.

One must often be struck with the controversy which arises from time to time round the price of gas in various towns, and with the readiness of the public to criticize the cost in one place as against another, without taking the trouble to examine or analyze the service offered or the product supplied, or the conditions under which the gas has been produced. There are many factors which enter into costs; and without full details comparison is futile—in fact, misleading. I propose to enumerate some of the more important factors, and to discuss them, in order to show how dangerous it is to make comparison without a thorough examination and analysis of all charges.

Capital Charges.

This charge embraces interest on the money borrowed, sinking fund, and depreciation. It may represent as much as 2s., or it may be as low as 4d., per 1000 c.ft. of gas sold. The difference between these two extremes would represent the selling price per 1000 c.ft. in some places. The undertaking with high capital charges may be a well-managed concern, and may, in fact, always have been, but still it is handicapped with a standing burden of 2s. per 1000 c.ft. That same undertaking in pre-war days may have been supplying gas at the lowest rate quoted in its particular district; and its low rate may have been responsible for its position to-day. We all know cheap gas is popular, and sales increase rapidly; and unless ample accommodation for extensions is available, new works may involve expenditure which will result in an increased price, with a natural falling off in consumption. This makes the position more acute—the capital charges having to be spread over a smaller consumption of gas. That is what actually happened in many industrial areas during the war. When the earning capacity of the worker increased, labour saving was encouraged, manufacturers used gas in preference to solid fuel on account of the limited labour available, the output of gas increased with leaps and bounds, and plant which could have coped with normal demands had to be increased, with the result to-day of high capital charges and a disgruntled public. They forget the past, they are indifferent to the future; and while the undertakings which to-day have high capital charges will in the next emergency be the fortunate ones in having ample surpluses in plant to meet any demand, this is forgotten in these hard times, when the only consideration is what gas costs in one town as compared with another.

An undertaking of any description has its hard times. It has to expend capital; but its process of writing-off brings its turn of prosperity, and no progressive undertaking can escape. Had anyone realized what a future was in store for gas, unlimited sites would have been provided, the building-up process would have been gradual, and the capital charges in most undertakings would have been more comparable than they are to-day. No one can be blamed for high capital charges. The future has to be provided for; but probably more reasonable interest on money for new works might be arranged, with slower and easier depreciation, so as to spread the burden over a longer period—particularly when these undertakings have expended capital during a period of inflated erecting prices, to supply a demand much in excess of the normal yearly increase.

Conditions under which Gas is Manufactured.

I do not propose to take into account production costs due to different types of plant, as most undertakings of the same size have plant of a similar kind, and the cost of production should vary little, but will confine my remarks to the more abnormal conditions affecting comparison. We have the location of the undertaking in relation to the source of the coal supply. The cost of coal in our revenue account represents in some cases at least 60 p.ct. of the total expenditure; while with other works, more fortunately situated, it probably does not represent 50 p.ct. In addition to this, there is the question of the disposal of coke and other bye-products. As already mentioned, the undertaking paying the nigher price for coal, situated as it usually is a long way from an industrial area, finds difficulty in disposing of its production of coke, and often has to resort to transport into industrial areas or shipment abroad at reduced prices, on account of railway freights. The same remarks apply to tar and liquor. Unless these are worked-up, they represent little or no revenue at all; and it is not an uncommon thing to-day—particularly in small works—for a payment to be made to get rid of the liquor. In some favourably situated undertakings, the total return from residuals is equivalent to the delivered price paid for the coal, whereas in the case of less favourably situated concerns the total return for residuals does not represent 60 p.ct. of the cost of coal. This cannot be attributed to bad management. In fact, it is quite possible that the more efficient plant and the better managed concern is the one in receipt of the smaller return.

We have the case of an emergency arising such as the lamentable coal dispute of 1926, when the importation of coal had to be resorted to, with disastrous result to the larger undertakings and adverse criticism of the management. Now the large undertaking is in a distinctly worse position in a case of this kind than the smaller ones. In fact, the latter invariably look to the former to see them through. The small undertaking can afford to purchase and speculate in small quantities from day to day, as a failure in supply may mean little or nothing, whereas the large works cannot. With them, a supply must be maintained at any cost, and they have to purchase months ahead in order to make certain of deliveries. Many cargoes may be afloat when a strike collapses, payment for which must be met. No one can anticipate the collapse of a strike; and it is unfair to compare the balance-sheet or the cost of gas in an undertaking whose stocks of high-priced coal are *nil*, with an undertaking which has probably afloat at the end of a strike thousands of tons, and, in addition, one or two weeks' requirements which may represent a substantial figure. It is only reasonable in circumstances such as these to expect that a large concern will take longer to recover than a smaller one after a strike or trade dispute.

Take my own case at the end of the strike in 1926. I had practically no stock, and I was able to purchase from day to day on a falling market. It may be suggested that it is all a question of anticipating the increased cost and increasing the price of gas accordingly; but it is not so easy to increase the price of a commodity which is measured quarterly as a material supplied and measured daily. I am convinced, however, that the public should be asked to pay for the increased cost during the emergency. They do not grudge the higher price while the emergency continues and no other fuel is available; and the reason is more obvious then.

Service Supplied.

I do not propose to discuss the question as to whether it is better to make a charge for all services rendered and aim at supplying gas to the public as cheaply as possible, or whether the maximum amount of service should be given free—the cost of same being levied in the charge made for the gas. I will simply show the wide divergence in the service rendered to consumers in different districts. In some cases service pipes are fitted entirely free of charge; in others a stipulated distance is run free, the remainder being charged; and in some instances the whole cost of the service has to be paid for. Regarding meters, we have them supplied free and also under meter rent; while cases have come to my notice where the consumer has to supply and maintain his own meter. Again, wide differences are found in the case of appliances. Some undertakings supply cooking and heating apparatus free of cost, whereas there are cases where no free loan system is in operation, the consumer having to purchase any appliances required. Even where undertakings are on a comparable footing regarding supplying free loan appliances, a comparison is difficult, as some towns have a static population (such as professional centres), while in a commercial and industrial area there is a tendency towards a floating population, and the cost of exchanging appliances is

higher in the one case than in the other. In some places a charge is made for the exchange of an appliance, and in others it is done free. Then we have free carcassing, such as we did in the 300 houses at Tranent. While this may be exceptional, it must be considered. There is also free maintenance, which has become popular in some towns, and the cost of which is an added burden in the price of gas. We have instances where a normal charge is made for this service; and, again, there is the undertaking doing no maintenance at all.

With these facts before us, it must be evident how difficult it is to compare prices without full knowledge of the service rendered, as I have no doubt this might represent in the undertakings giving the maximum service a figure as high as 5d. per 1000 c.ft.

Quality of Gas.

The Gas Regulation Act did much to bring the supplies of gas on to a comparable basis; but, unfortunately, the public still continue to make comparison on the old and well-known method of per 1000 c.ft. in preference to the therm. Press criticisms are usually quoted on this basis. It is obviously unfair to compare the price of a gas of 350 B.Th.U. with that of a gas of 500 B.Th.U.; but this is what is actually done. Again, we have the case of the undertaking which is operating under the Gas Regulation Act, and whose quality is carefully checked by a gas examiner; while a similar concern which has not adopted the Act, declaring a value of (say) 450 B.Th.U., could supply a gas of 10 to 50 B.Th.U. less, without the knowledge of the public. While I do not say this actually happens, it demonstrates the possibilities. I realize the difficulty of applying the Gas Regulation Act to small works; but I have no doubt this could be got over if an investigation of their case were made, and I do feel that the Act should be imposed on all undertakings or none. If it is unnecessary in the one case, it is an added cost to the gas company and the local authority in the other.

How Rate is Quoted.

When one hears the price of gas quoted, it is usually the domestic or ordinary rate which is referred to. One undertaking may supply 70 p.ct. of its gas through prepayment meters and charge 1s. per 1000 c.ft. more to these consumers, while another undertaking may supply practically the whole of its gas through ordinary meters. Now if these two undertakings have the same domestic rate, it is obviously wrong to say they are supplying gas at the same price. If the undertaking supplying by ordinary meter is 6d. per 1000 c.ft. higher than the other, it is subjected to unfavourable criticism, although the average price paid for the gas is actually less. It may be suggested that the 1s. extra is justified to cover (*a*) the additional cost of the prepayment meter and maintenance, (*b*) collection of money, (*c*) the danger of loss by theft, (*d*) the prepayment consumer's use of a smaller amount of gas than the ordinary consumer.

Additional Cost of Prepayment Meter.

Let us examine the subject under these heads. A No. 2 prepayment meter will cost £1 more than a similar size of ordinary meter; and if we take 12½ p.ct. of this amount, it will amply cover interest, depreciation, and additional maintenance. This would represent 2s. 6d. per annum. But why should we single out the additional cost for the meter to justify a higher rate? The service pipe for the ordinary consumer may have cost £1 more than that for the prepayment customer, but still no additional charge is suggested.

Collection of Money.

The prepayment consumer pays for his gas as it is used; and if he is not treated as a ready-money customer, it is no fault of his. So far as he is concerned, he has handed over the money to the gas company. If they, in turn, do not collect for six months, should he be penalized? The money, if collected monthly, would assist the company in meeting their accounts and save interest on bank overdraft, which would help repay the additional cost of collection. In my own particular case the cost of collection is negligible as compared with the survey of ordinary consumers' meters; but, if we assess it at half-an-hour per meter and four collections per annum, it represents about 3s.

As to the danger of theft, I find that loss in this direction is no more than bad debts incurred in the case of ordinary consumers, and where theft is actually committed one can usually recover with the threat of taking police action.

Consumption of Prepayment Consumer.

Is it generally the case that the prepayment consumer uses less gas than a similar consumer with the same rated capacity meter of the ordinary type? It may be that in an individual case this is so; but taken collectively, I have always found that the average consumption per prepayment consumer is as high as, and in many cases higher than, the ordinary type. Take two cases which recently came to my notice. One ordinary consumer was using only 5000 c.ft. of gas per annum; and the price being 4s. per 1000 c.ft., the return from this particular consumer was £1 per annum. Next door a consumer was using through a prepayment meter 40,000 c.ft. per annum, which, at 5s., represented £10. No one could argue that the ordinary consumer was the more profitable. Still the prepayment consumer had to pay 1s. per 1000 c.ft. more for the gas consumed—a grossly unfair position. I realize we must legislate, not on a single case, but on the comparative basis of the total gas sold through each type of meter; and on this basis I make no difference in the charge. In fact, I have found the prepayment consumer to be the more profitable; and if any extra charge was suggested, it would be to the ordinary small consumer that I should apply it. I feel that in many cases there is no justification for charging a higher rate for gas supplied to prepayment consumers; and where there is justification, the charge is higher than is necessary to cover the additional cost of supplying such consumers.

Special Rates and Discounts.

Again, we have the case of undertakings giving favourable terms to industrial users. In some towns, in order to encourage the use of gas for certain purposes, rates at approximately cost of production are granted. As, however, there are usually particular circumstances in which special rates are quoted, I do not propose to take these into account in my comparison. I am, however, of opinion that, when a comparison is being made of the prices of gas in different towns, the most equitable basis is to compare the average price arrived at by taking the total revenue from gas and dividing it by the number of cubic feet sold. I am also of opinion that the time has arisen for a revision of the method of charging on the lines one often sees quoted from America.

Rates and Taxes.

These vary very considerably throughout the country; and, in addition, some gas undertakings have to contribute sums of money for relief of rates, and also to subsidize or support less profitable public utility concerns—a most unfair and unreasonable charge with which to burden the gas-consuming public. Excluding the latter, however, variations of as much as 3d. per 1000 c.ft. of gas sold are to be found in different towns, due to the difference in the charges for rates and taxes. The manager of the gas undertaking has no control over this charge (apart from income-tax); but if the price of gas is high he can be subjected to adverse criticism by the public, and, in the case of companies, by the local authority, although they themselves through extravagant municipal administration are contributory factors to the high charge.

Conclusion.

From the foregoing examination, it will be evident to most of us how futile it is to compare the domestic rate in one town or village with another, and quote it as the rate applicable for the particular place, unless a careful examination of all the factors is made; and how unfair and unreasonable it is for newspaper correspondents to criticize adversely the management and results of an undertaking on the basis only of the charge made to the consumer. But this is what actually happens, with discouraging results; and it is often the cause of unnecessary irritation between the supplier and consumer. If my address does anything to discourage this undesirable state of affairs, I shall feel I have made a helpful contribution to the industry in the Waverley area.

Discussion.

Mr. J. Richmond (Penicuik) asked the reason why free carcassing had been carried out at Tranent.

The President replied that it was simply for the reason that the coal industry was practically dead. He had tried to encourage the mining section of the community to remain gas consumers by putting forward this scheme of free carcassing.

Mr. Richmond thought it was somewhat misleading for Mr. Urquhart to refer to this as "free" carcassing. The cost would, he presumed, actually go on to the price of gas.

The President replied in the affirmative.

Mr. David Vass (Perth) thought Mr. Urquhart was to be highly complimented on the way in which he had carried out his alterations at Tranent. A question that frequently cropped up in small works was in regard to the best method of mixing gas in a Tully plant. He was anxious to know if any of the members had experience of working a Tully plant with a relief holder, and what had been the measure of success achieved.

The President said the works were in a bad way when he took possession of them. He confessed there had been some difficulties with the mixing of gas; but the Tully plant had really saved the situation for him at Tranent. The reception given to his address would be an encouragement to him to carry on.

Presentation of Medal.

Before the proceedings closed, Mr. Skea, of Jedburgh, a former President, presented Mr. Urquhart with the Medal of the Association.

Votes of thanks were passed to the retiring President and the members of the Committee.

Luncheon was served in the Tontine Hotel; and in the afternoon Mr. J. D. Scott, of Messrs. Alder & Mackay, Ltd., Edinburgh, had charge of the arrangements for the Golf Competition.

NEW CARBONIZING PLANT FOR DEVONPORT.

Plymouth Corporation's Enterprise.

Quite a large company of interested people, including the Chairman of the Plymouth and Stonehouse Gas Company (Mr. J. H. Ellis), were present at the Devonport Gas-Works of the Plymouth Corporation on Tuesday afternoon, June 26, to witness the official starting-up of the new retort bench—a ceremony which was performed by the Mayor of Plymouth (Councillor W. H. J. Priest). The Chairman of the Gas Committee of the Corporation (Major J. Clifford Tozer) occupied the Chair at the preliminary proceedings, and invited the Mayor to inaugurate the new plant by charging the first retort, which Councillor Priest did.

The MAYOR subsequently expressed his pleasure at being enabled to take part in what he described as one of the most important milestones in the history of the works, and congratulated the Chairman and the Committee on the adoption of the new methods of charging the retorts and bringing up the coal. Incidentally, he suggested that gas committees were well advised, instead of budgeting for large surpluses, to give the consumers the benefits realized from the adoption of up-to-date machinery.

Mr. H. J. TOOGOOD, on behalf of Messrs. Robert Dempster & Sons, Ltd., of Elland, and the other contractors who shared in the provision and erection of the plant, then presented to Major Tozer a handsome silver rose bowl, suitably inscribed. In doing so, Mr. Toogood said he would like in a general way to touch on the epoch-making characteristics of the new carbonizing plant. As to the economy in the first cost of installation, 90 new retorts now stood where originally stood 64 worn-out retorts. Each of the new retorts was both longer and bigger—so much so that the new bench had 100 p.ct. greater gas manufacturing capacity than the original bench, and stood on the same site. Hence, if there were truth in the philosophy that to make two blades of grass grow where hitherto only one blade grew made a man a benefactor of the race, the new installation would become a benefaction to the gas-consuming community of that portion of Plymouth. The principle of carbonization adopted in the horizontal principle had had a hundred years' service with all sorts and conditions of coal, so that it was well tried and proved. Horizontal retorting, in fact, was the oldest principle of carbonization. Yet, parodoxical though it might seem, it had actually formed the subject-matter of the majority of recent papers on carbonization read before The Institution of Gas Engineers; and even this year it was paramount. So that it was only reasonable to expect, given some improvement to details and to the refractories, that it would continue, where cheap gas was the desideratum, to find increasing adoption.

NO ASCENSION PIPES.

It was well known that stopped ascension pipes had for many years been a bar to progress with horizontals, because any serious attempt to increase efficiency by increasing the carbonizing temperature was immediately countered by an increased number of stopped pipes. The Devonport installation had no ascension pipes; and the gas off-take pipe descended into the cooler regions of the cellar. Thus stopped pipes were completely conquered, to the enhancement of efficiency and the advantage of the men. Fundamentally it had long been recognized that advantages would accrue if the gas could be evacuated from the retorts exactly as, and when, it was evolved from the coal. This ideal was impossible of accomplishment, so that practice became a matter of compromise. Realizing that hot ascension pipes were in reality chimney vents to the retort, and that they were hottest at the end of the charging period, when the gas yield was at the minimum, and coolest when the gas yield was at the maximum, it would be seen that their capacity fluctuated inversely to the gas volume—so much so that a continuous but small degradation of gas values ensued. As the descension gas off-take pipe in the new plant was common to five retorts, and each retort was in a widely different stage of distillation, the chimney effect was killed, and operation of the law of average set up, so that degradation of gas was considerably reduced, to the increase in gas yield, both qualitatively and quantitatively.

CARBONIZING TEMPERATURES.

He wished to make a few remarks as to higher carbonizing temperature. For over thirty years silica had proved invaluable in the combustion chambers of retort settings. In modern plant the use of silica had been extended to the retorts and interior walls of the setting; and this admitted of the use of considerably higher temperatures actually on the walls of the retorts themselves. Accommodation for the expansion and growth of this increased volume of silica had introduced structural problems, inasmuch as, if too little or too much expansion space under the main arch was left, the retorts were distorted in shape either by external pressure from the superimposed main arch or by the internal pressure of the stoking machine. In the Devonport installation, on the principle of prevention being better than cure, the main arch had been deleted entirely, and in its place was built a simple dead-weight flat cover of brickwork, which lifted on an even keel to accommodate exactly the expansion and contraction of the silica mass. This construction was warranted under three heads: (1) The saving in brickwork. (2) The saving in fuel (there being less brickwork to heat up and maintain hot). (3) The automatic allowance for silica expansion and growth. The gas industry had been going for 116 years, but he believed this was the first time a retort bench had ever been built without a main arch.

Major TOZER, in the course of some remarks as to the progress made by the Corporation's gas undertaking, stated that sales of gas now amounted to nearly 800 million c.ft. per annum, coal and equivalents carbonized to over 67,000 tons, and the consumers to nearly 25,000. They supplied good gas at one of the lowest prices throughout the country. He believed that cheap gas was the direct way to an increased consumption per head; and they looked forward to the Dempster-Toogood horizontal carbonizing plant now installed to enable them further to reduce the price.

The stoking machines adopted with the installation are of the Fiddes-Aldridge type.

After the company had inspected the works, they were entertained to refreshments in the drawing office by the Chairman of the Gas Committee.

Mr. C. Carrington Barber is Engineer and General Manager of the works.

DESCRIPTION OF THE CARBONIZING PLANT.

DEMPSTER-TOOGOOD MODERNIZED HORIZONTALS.

It is necessary at the outset to realize that the original carbonizing plant consisted of three benches of eights, in three tiers, built in line, or in series, and furnished complete with stoking machines, coal plants, and telpher hot-coke plant; the whole housed in a retort house of the curved station-roof type.

The central bench of eight beds of eights between the chimneys having finished its useful life, it was (to provide the necessary increase in carbonizing capacity) agreed to be the cheapest scheme to substitute for these beds a modernized bench of horizontal retorts, so schemed as to utilize the existing coal and coke handling plants, the retort house roof, the stage floors, and the existing chimney, with the minimum of alteration.

New Bench.—How successfully this scheme worked out is shown by the fact that the carbonizing capacity of the new plant, standing on the same site, is 100 p.ct. larger than that of the bench it replaced—*i.e.*, the new bench consists of nine beds of tens, 24 in. by 18 in. ⌀ by 22 ft. 6 in. long; while the old bench contained eight beds of eights, 23 in. by 16 in. ⌀ by 20 ft. long.

Retorts.—Of the nine beds, silica built-up retorts are set into six beds, moulded siliceous retorts in two beds, and moulded fireclay retorts in one bed. The several materials are spaced alternately along the bench, so that, allowing for seasonal variations of plant requirements, each material will work the same time-period during the life of the bench. In this way, the answer to the question as to which material is best in use will, when the time arrives for re-setting, be found by the condition of the bench.

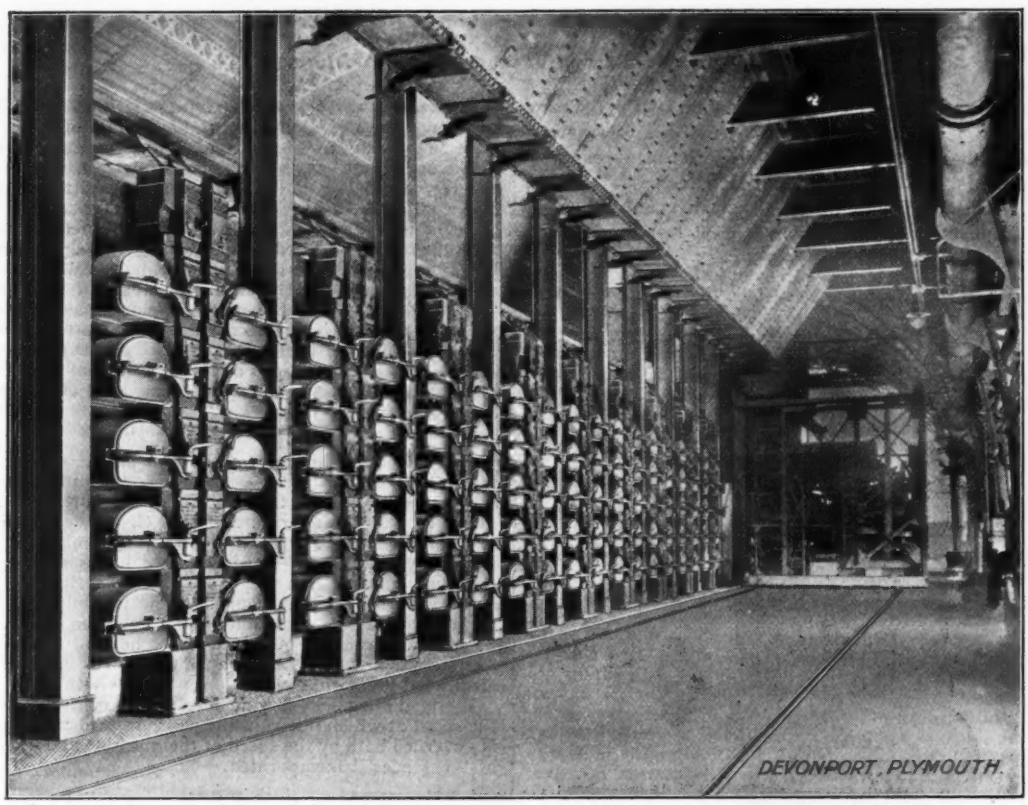
Deep Furnaces.—To get an abundance of producer capacity (the driving force of carbonization), and yet to retain the level of the existing floors, the old foundations were excavated, whereby the desired 12 ft. height of furnace was obtained.

Furnace Grates.—The well-known non-clinkering screen-bar grates of large area are applied. These grates are characterized by the downward creep of the fuel during gasification (there being no steps to arrest descent). Thus the ash largely falls out as ash, and agglomerations and clinker formations are prevented.

Furnace Control.—There being no ashpan doors, there is no primary air to control, so that the work of the staff is considerably reduced. At the back of the fires producer gas dampers are situated, to regulate the condition within the producer to level gauge, after which no further adjustments are necessary for the producer working.

Two-Row Two-Ply Regenerators.—The regenerators are of tubular construction; the tubes being machine-made of close-grained fireclay, laid horizontally to facilitate inspection and repair, and bonded and grouped back-to-back, so that there are two thicknesses of fireclay tube-walls between the descending waste heat and the ascending secondary air. Losses by short circuiting are overcome by the extremely air-tight and strong, but thin, divide formed by this construction.

Heat Control.—Both the secondary air and the waste heat are controlled for each quarter length, and for each vertical row, of the retorts, so that the available heats are spread and



CHARGING SIDE OF THE BENCH.—SHOWING THE DESCENSION SCRUBBER PIPES.

definitely controlled along the length of the retorts, and black patches are totally obviated, to the enhancement of over-all efficiency.

Combustion Chamber Arches.—These are formed as complete ellipses, as giving the maximum of strength and a definite security to those vital points the keystone and the nostrils of the producer arch, rendering all nostrils visible from the outside of the setting, and giving body-room for the retort setter when repairing the setting. The bench top and bench fronts are insulated as far as is practicable, to conserve the heat and save the fuel. The main flue is prepared to facilitate the future adoption of a waste-heat boiler.

Furnace Charging-Door.—This is insulated, and slides on a continuation of the furnace charging frame, so that it never leaves its metal sealing face. Consequently, it is retained at more even temperatures, and warping and leakage are thereby obviated, to the betterment of producer conditions and an easement of the stoker's work.

Flat Bench Cover.—A considerable amount of brickwork is saved by the total omission of all main arches; and there being less brickwork to heat up and maintain hot, there must be a corresponding reduction in fuel consumed. The bench cover is constructed of square bricks built as a dead-weight cover directly on the interior stay walls. Thus are expansion and growth of silica exactly and automatically accommodated.

Descension (Scrubber) Offtake Pipes.—Stopped ascension pipes are rendered impossible by the substitution of descension scrubber pipes. This offtake at once characterizes the appearance of the bench, inasmuch as all mountings, including the retort house governors, are grouped at ground level, where better supervision and control in practice are offered, and the bench top is rendered free of all mountings, to the great advantage of the staff. Each descension pipe is common to a vertical row of five retorts; and as the five retorts will at all times be in widely different stages of distillation, more uniform conditions within the retorts are set up and maintained, to the advantage of the gaseous yield, both qualitatively and quantitatively.

The gas scrubbing is established by a continuous spray of either tar or cooled fixed ammoniacal liquor down each descension pipe. The tar is thus the more quickly removed from the gas, and before the semi-cooled gas is passed forward to the condensers for the extraction of the free ammonia. The liquor from the sprays is collected and cooled to a definite degree in an underground concrete tank formed as a trough, and extending the full length of the bench; and after cooling, the liquor is re-circulated.

Coal Plant.—Forty-eight hours' coal capacity overhead continuous bunkerage is installed; the coal being distributed to the hoppers by a new pushplate conveyor, which in turn, receives its coal from the conveyor of the existing coal handling plant. A dormer roof is formed in the main roof covering; but cutting or modification of the main members of the existing curved roof was obviated in scheming the new plant.

Coke Plant.—The existing telpherage is utilized intact, by the simple expedient of moving the position of the track to accommodate the longer retorts. An electrically-propelled coke bus on the discharging side of the bench serves the three functions of furnace charging chute, telpher skip filler, and stoker's travelling platform when attending the top retorts.

Stoking Machine.—The stoking machine is of the Fiddes-Aldridge type, and is complete with semi-automatic door-opening mechanism for the easy opening of the overhead bunker doors. Further, the latest devices are adopted in order to maintain regularly the heavy charges (17½ cwt.) for twelve-hour charging periods and two eight-hour shifts per diem.

Enamels for Sheet Iron.

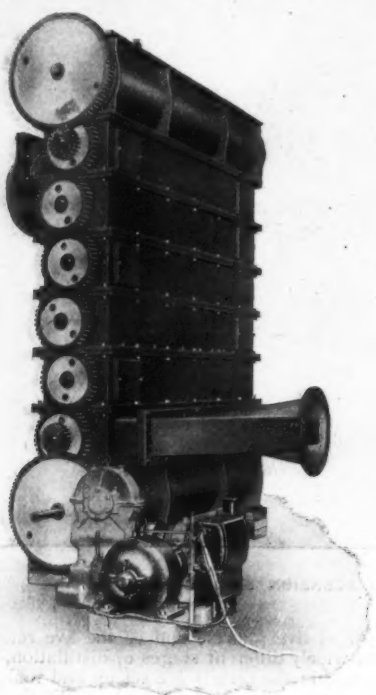
Reference is made in a United States Bureau of Standards note published in the "Journal of the Franklin Institute," to a series of adhesiveness tests showing the effects of treating sheet iron in various ways before applying light-coloured first-coat enamels. In the first place it was found that adherence was improved by allowing a thin coating of oxide to form over the iron in a furnace before applying the enamel. The application of different cobalt compounds directly to the metal also proved beneficial in varying degrees. Accordingly the combination of both treatments was tried, and with better results than were obtained by either treatment alone. Best results were secured in the application of the cobalt salts when the metal was dipped in a hot solution, and allowed to remain there until it reached approximately the temperature of the bath. Cobalt nitrate appeared to be about the most desirable of the cobalt salts to apply to the iron, because it decomposed on the iron with a comparatively gentle heat treatment, and the decomposition product (presumably essentially cobalt oxide) had but little tendency to stain the enamel.

Mr. Hollings' Slide Rule.—It will be recalled that during the course of the discussion on Mr. H. Hollings' paper before the Institution of Gas Engineers at the Cardiff Meeting, Mr. H. D. Madden inquired where the slide rule exhibited could be obtained. It is made by Messrs. B. J. Hall & Co., of Chalfont House, Great Peter Street, S.W. 1, its price being 10s. 6d.

"UNIVERSAL" COAL DRYER.

A Simple Method of Abstracting Moisture.

With the object of securing at the minimum cost the advantages accruing from the abstraction of moisture from coal after it leaves the washery, and previous to its being charged into coke ovens, &c., for carbonization, Mr. Reginald V. Farnham, M.I.Mech.E., has designed, and patented, a dryer of remarkable simplicity and with complete ability to perform what



Machine Fitted with Taper Inlet Branch for Waste-Heat Products.

is required of it. A trial installation which is at work at the Barrow Collieries, near Barnsley, affords proof of both these points.

The "Universal" coal dryer is built up in sections, the number of which is in accordance with the duty required of the machine. Each section is complete with its own "retarder." The coal to be dried is fed direct from the bunkers into a cylindrical hopper, within which a number of radially disposed arms, geared to the spur wheel of the top retarder, revolve in an air-tight manner. Each chamber formed by these rotatable arms equals the capacity of the retarder. As the arms revolve, the coal falls into the first retarder, which is in a correct position to receive it; and from that it passes down to the next section, and so on to the bottom of the dryer. The retarders rotate in opposite directions; their phase relation being such that, as the coal is delivered from one retarder, the retarder below it is in the correct position to receive it. The coal thus cascades from retarder to retarder, being obstructed in its descent, so as to be subjected to the heating medium for any desired period. When the dryer operating at the Barrow Collieries was inspected, it was seen that the retarders were perfectly clean; it is stated that even when "slurry" is fed into the machine, no "making-up" is possible. No single piece of coal is stationary for an instant on its transit through the machine. The power requirements are small. The main portions of the dryer are of heavy cast iron; no sheet metal being employed in any part of the machine.

Methods of Heating.

As to the heating medium, waste products may be led to the machine, or gas can be combusted in any form of brick setting built outside the machine. The firebrick setting is maintained at a temperature of 600° C.; while the temperature of the outlet section at the top of the machine is almost stationary at 110° C.—the difference being extracted by the moisture contained in the coal. The velocity of the heated air is governed by the damper at the fan inlet at the bottom of the dryer. The computation is that when coke oven, blast furnace, or producer gas is used for heating the air, the consumption will not exceed 0·25 therm per 1 p.ct. of moisture abstracted per ton of coal.

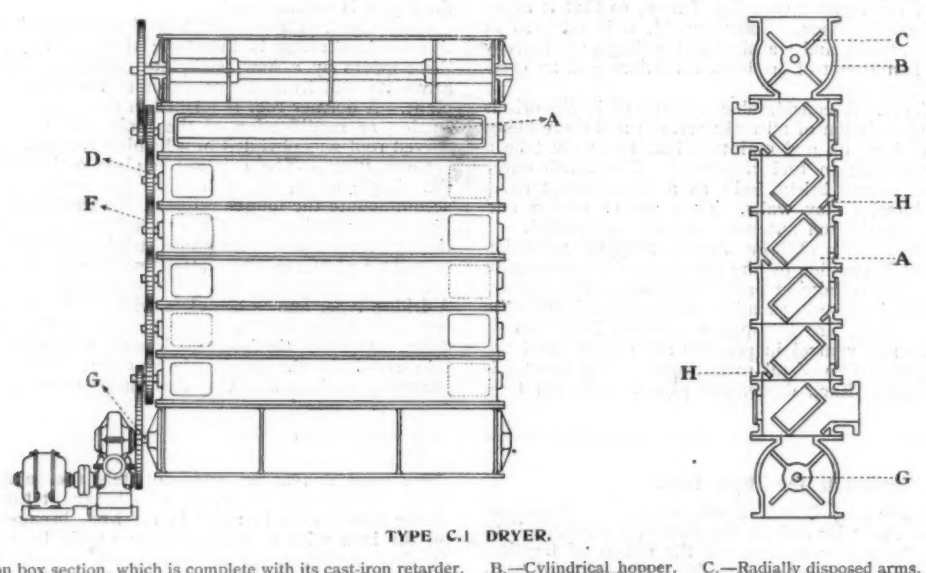
While the capacity of the machine is controlled entirely by the speed at which it is run, the percentage of moisture removed is governed both by the speed of the machine and by the number of "cascades" incorporated.

Features of the "Universal" Dryer.

From what has been said, it will be gathered that the simplicity of the dryer is such that it may, in normal circumstances, be relied upon to run indefinitely without attention; while with mechanical feed of the wet coal to the hopper at the top, and also mechanical removal of the dried coal from the discharge chamber at the bottom, no extra labour should be required to work the machine, which can be treated merely as part of the bunker. There is nothing that can interfere with its regular duty; and the discharged coal is of exactly the same size as when fed into it.

The temperature of the coal when discharged from the machine varies from 150° to 100° C., at which it can be used, or it can be allowed to cool as desired. As already pointed out, abnormal quantities of moisture can be abstracted by increasing the number of sections, thus creating extra cascades, or by decreasing the speed of the retarders, or the coal may even be passed through the machine more than once. The design of the machine is such that maintenance charges should be reduced to a minimum.

The machine is being marketed by the Universal Dryers Company, Ltd., of Queen's Road, Barnsley.



TYPE C.1 DRYER.

A.—Cast-iron box section, which is complete with its cast-iron retarder. B.—Cylindrical hopper. C.—Radially disposed arms. D.—Steel spindles. F.—Spur-wheel. G.—Shaft to which are coupled reduction gear and motor. H.—Baffle to direct coal into the retarder below.

THE THERMAL INSULATION OF RETORT SETTINGS.

By A. J. DALE and A. T. GREEN.

[An Extract from the Report of the Refractories Joint Committee, of which Mr. John P. Leather is Chairman, presented at the Cardiff Meeting of The Institution of Gas Engineers.]

Generally speaking, heat losses accounted to conduction through the walls surrounding any heat reservoir, with subsequent radiation and convection from the surface open to the atmosphere, can be minimized:

(*a*) By increasing the thickness of the protective brickwork.
(*b*) By substituting the normal brickwork partly or entirely by material having a lower thermal conductivity.
(*c*) By decreasing the emissivity values of the external radiating surfaces.
(*d*) By correct tieing of the outer walls of a setting, the filling of any cracks that may appear, and pointing of the joints as occasion demands.
(*e*) By modifications in design similar to those outlined later in this paper.

There is little of importance to be remarked about method (*a*) above. According to the fundamental equation for heat flow by conduction, rate of heat flow per unit area is inversely proportional to the thickness of the wall, other factors remaining constant. The erection of thick walls would, however, involve such additional expenses in labour, material, and occupation of floor space, and if adapted in roof construction might introduce such increased mechanical strains within the setting that, as a method of reducing heat losses and retort house temperatures, it is neglected from the present consideration.

INSULATION OF HORIZONTALS.

During the course of our inspection of a large number of horizontal settings in various parts of this country, and from information gathered by discussion with gas engineers and the constructional companies, it has become obvious that two very distinct methods of insulation have hitherto been applied to horizontals. These we may call:

(1) Insulation as an afterthought.
(2) Insulation as incorporated in the original design.

INSULATION AS AN AFTERTHOUGHT.

By this, we refer to those cases where insulating material, generally in the form of porous diatomaceous brick, has been applied to the retort tops and to the outer walls as an experiment, after the setting has previously been running in an uninsulated condition.

As a typical example of the results, we may refer to the trials made by Mr. J. S. Thorman at the Southall Works of the Gas Light and Coke Company. The retort house contained 12 sets of horizontals, with 10 retorts per setting, and as a preliminary trial the front and back walls and the roof were covered with a 3 in. layer of porous brickwork of a diatomaceous composition. So far as the roof was concerned, we were informed that an immediate advantage was recorded, and had continued over a period of twelve months.

The external temperature there was considerably lower after insulation than before, heat losses from the roof were, in consequence, greatly reduced, and atmospheric conditions at the top were rendered relatively pleasant and cool. In fact, this is a generally observed or reported result when top insulation has been applied as an external layer. However, the complete insulation of the front and back walls, if effected in laying the porous brickwork on the original outer face, is liable to introduce certain undesirable complications. At Southall, the new layer of brickwork was supported on the external iron beams which run along the walls of the setting; and at the outset was carried close up to and around the metal mouthpiece. This procedure resulted in a definite advantage, but involved a serious drawback. An efficient carbonizing temperature was developed almost to the ends of the retorts, which meant either a reduction in carbonizing time per retort, or a more complete carbonization of the charge. Unfortunately, however, overheating of the metal mouthpieces developed. It therefore became essential to strike a compromise between gain and loss, and this was achieved by cutting away several inches of the insulating layer around the mouthpieces. In this way serious overheating of the mouthpieces has been eliminated while still retaining a considerable improvement in the temperatures towards the retort ends.

This simple cure of a serious disadvantage of thermal insulation of the front and back walls of horizontal settings is important, for at one works visited, insulation at these locations had been tried and rejected owing to the deformation of tie-rods and overheating of the mouthpieces.

It is accordingly interesting to note that in the Dempster design of horizontal setting at Stretford front and back walls are partly insulated as shown in figs. 1 and 2, the insulating brickwork being on the outside of the setting, but clear of the mouthpieces.

ADVERSE THERMAL EFFECTS OF EXTERNAL WALL INSULATION ON HORIZONTAL SETTINGS.

While one definite advantage of the application of a layer of thermal insulation outside the front and back walls of horizontal settings is the improvement in end temperatures of the retorts, our experience has been that retort house conditions opposite such walls cannot be described as any better than those observed opposite uninsulated faces. This statement, it should be emphasized, applies only to retort house conditions on the floor level, and not to atmospheric circumstances above insulated tops, where a great improvement has always been noted.

At the Southall Works of the Gas Light and Coke Company where wall insulation had been applied in a manner previously described, inspection of the original face of the setting through opened joints of the insulating course indicated a temperature there above a dull red heat, presumably around 550° C. Re-

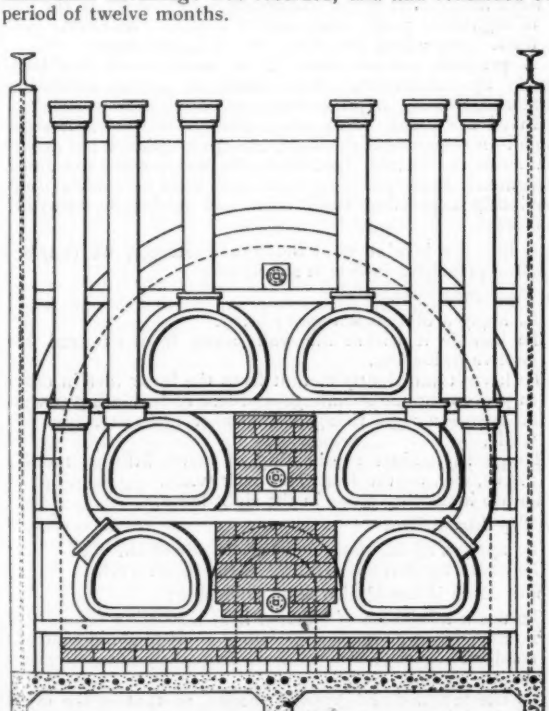


Fig. 1.—Exterior Insulation to Non-Cavity Walls.

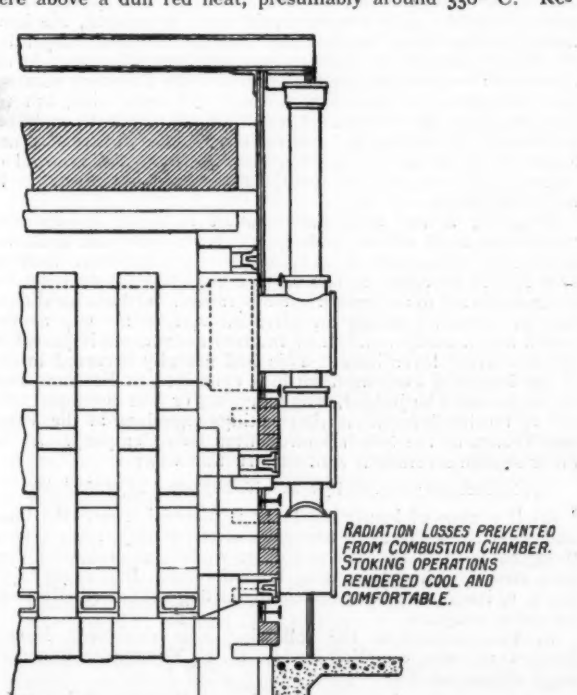


Fig. 2.—Exterior Insulation to Non-Cavity Walls.

membering then that the inner flanges of the metal beams supporting the insulating course must be in contact with the old face at this greatly increased temperature, it follows that the outer flanges of such metal work are at a much higher temperature than obtained before the application of the insulating blanket. Hence, radiation and convection loss from the exposed metal surfaces may be so increased, after insulation in this manner, as to nullify completely reduced radiation and convection from the face of the insulated areas.

It was possible to hold the hand for some time at the surface of the insulating bricks, but it was also obvious that mouthpiece and metal surfaces were at comparatively high temperatures.

There is need for incorporation of insulation behind all metalwork surrounding horizontal settings, and in actual contact with the walls.

If, for the purpose of structural stability it is considered desirable to apply the blanket of insulating brickwork as an external facing, then there seems no reason why the brickwork immediately behind the metal bracings should not be of ordinary red brick, and the remaining face of the brickwork of insulating material, with exposed surface flush with the inner flanges of the bracings. In this way expansion strains would be carried by masonry of high mechanical strength, metal work temperatures would be considerably reduced, and the insulating blanket would effect its usual reduction in radiation and convection losses from the fully exposed faces of the walls. Such an arrangement is illustrated in fig. 3.

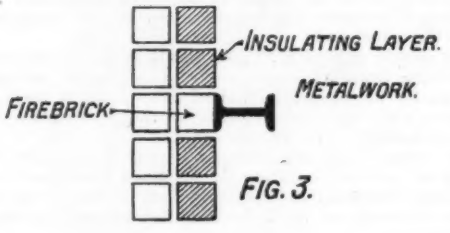


FIG. 3.

To avoid overheating of the mouthpieces, insulation might be cut away concentrically, or a special layer of insulation inserted within the retort walls at these positions (fig. 4), thus lowering the temperatures of the inner ends of the metal work.

INSULATION OF HORIZONTALS, INCORPORATED IN ORIGINAL DESIGN.

In view of the effects noted when insulation has been applied to horizontal settings after these had been designed and erected on an uninsulated basis, it becomes possible to lay down certain general guiding principles regarding preconceived insulation of new horizontal settings. Before so doing, however, it seems desirable to recount other observations made during a recent tour of inspection.

First, in view of the comparatively low mechanical strength and small resistance to abrasion, &c., of normal quality diatomaceous bricks, it is recommended that, in general, the insulating blanket should be protected from the usual disintegrating effects prevalent in the average horizontal retort house. At the Stratford Works of the Gas Light and Coke Company external wall insulation of horizontal settings had been tried, but the insulating face deteriorated so rapidly that it was not considered worth while to replace it. On the other hand, at Stretford and Southall, the material was in good condition, and renewal or maintenance cost of the insulated face would appear to be negligibly small.

Secondly, if the insulating blanket is to be incorporated within the walls of the setting, and hence protected from the destructive influences at work on the exposed face, then (*a*) care should be taken to ensure that the material does not become subjected to an excessive temperature. Otherwise shrinkage will occur, forming an extended vertical air gap or flue which might easily nullify any thermal advantages imparted by the insulating layer itself. This had actually occurred in one of the insulated horizontal settings examined at Beckton, and, so far as could be judged, was occurring or had developed with one of the insulated horizontal settings examined at the Vauxhall Works of the South Metropolitan Gas Company. At the latter station a common wall construction was:

4½ in. firebrick; 2 in. cavity filled with slag wool; 4½ in. firebrick.

(*b*) If a zone of insulating brick is placed between the inner and outer brick layers of the walls of the setting, some type of tieing between these inner and outer walls is desirable. Otherwise structural instability may later develop. Insulating brickwork, of itself, may be insufficiently strong to be used effectively for tieing purposes.

In this connection the following note regarding Messrs. Drakes' practice, supplied by Mr. M. F. Thompson, is accordingly of interest.

> Personally, I very much favour the use of insulating material, and both recommend and adopt it whenever possible. We use (diatomaceous and asbestos composition bricks) and invariably place these immediately behind the front 4½-in. wall. It is, however, necessary to tie the fronts in with firebricks, as the insulating materials are not serviceable enough for facing; thus the benefit of insulation is lost on every heading course.

An alternative method of tieing the two walls together has been tried out in the insulation of pottery ovens, and might possibly find application in the insulation of the front walls of horizontals. In this procedure, a 3-in. or 4½-in. gap is left between the inner lining of the kiln and the outer structure. This gap is bridged at regular intervals by special tiles of thickness about 3 in. These serve to tie the inner wall to the outer one, and the space between the tiles is rammed with kieselguhr or a pure variety of diatomaceous earth. Here again, however, a certain measure of insulation is lost, owing to the relatively high thermal conductivity of the tieing shapes.

Another interesting and promising method of tieing the inner and outer walls is that described to us by Mr. H. J. Toogood, of Messrs. Dempster. The disposition of the insulation within the wall is illustrated by fig. 5, regarding which Mr. Toogood writes:

> To counteract this tendency (towards instability, air-space formation, &c.) and to provide and safeguard the insulation, this (insulating) brick filling is built in a special manner, thus: The inside and outside faces of the 16-in. retort wall are of firebrick to withstand wear and tear, and

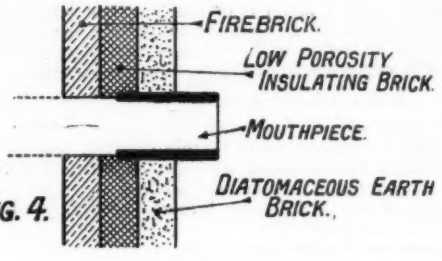


FIG. 4.

> are 4½ in. and 9 in. thick respectively, but alternating each 9 in. of height, thereby forming two mutually-bonded firebrick faces 2½ in. apart. Into the interior and zig-zag spaces is built 2½-in. thickness of standard porous insulation brick. Thus, paradoxical though it may seem, while the inner and outer firebrick faces are bonded one with the other, with the full strength of firebrick, yet the whole area is insulated without strain on the insulating bricks.
>
> This unique construction, formed wholly of standard bricks, covers the joints, introduces maximum insulation, retains without sacrifice the benefits of firebrick bonding, and fulfils its function to the great advantage of lasting economy.

Incidentally, the same diagram, fig. 5, illustrates also:

(*a*) Roof insulation; (*b*) an interesting development in the use of sight-hole plugs composed of a porous diatomite product. Regarding the latter, Mr. Toogood says:

> A practical advancement of no mean order has been made by substituting plugs made of porous insulating material, having a projecting portion of size to suit the grip of the hand. This plug, when taken from a sight hole in a combustion chamber, though bright red hot at one end, can comfortably be held in the hand, while obtaining pyrometric readings. Hence, no tool need be carried, thus obviously expediting supervision and adding to everyday efficiency.

Regarding the insulation of horizontal settings, we consider the guiding principles in design should be:

For Wall Insulation:

(*a*) To apply a diatomite type of brick.
(*b*) To include it within the wall, away from external disruptive influences.
(*c*) To keep it sufficiently distant from the inner face in order to prevent undue shrinkage and loss of insulating power.
(*d*) To ensure a rigid tieing of the inner and outer firebrick walls.
(*e*) To guard against overheating of metal fittings, mouthpieces, &c., on the front and back walls.
(*f*) To use insulating plugs in the sight holes.

For Top Insulation:

(*a*) To apply a 4½-in. course on the outside of the roof.
(*b*) To guard against overheating of the metal-work.

In both cases it would also seem advisable:

(*a*) To use a minimum of efficient heat insulating cement.
(*b*) To use shapes as large as possible, so as to avoid a higher conduction loss (which we have frequently noted to occur via the joints).
(*c*) To use tongued-and-grooved shapes, so that in the event of the joints opening, direct radiation from the hot face in front of the insulation is obviated.

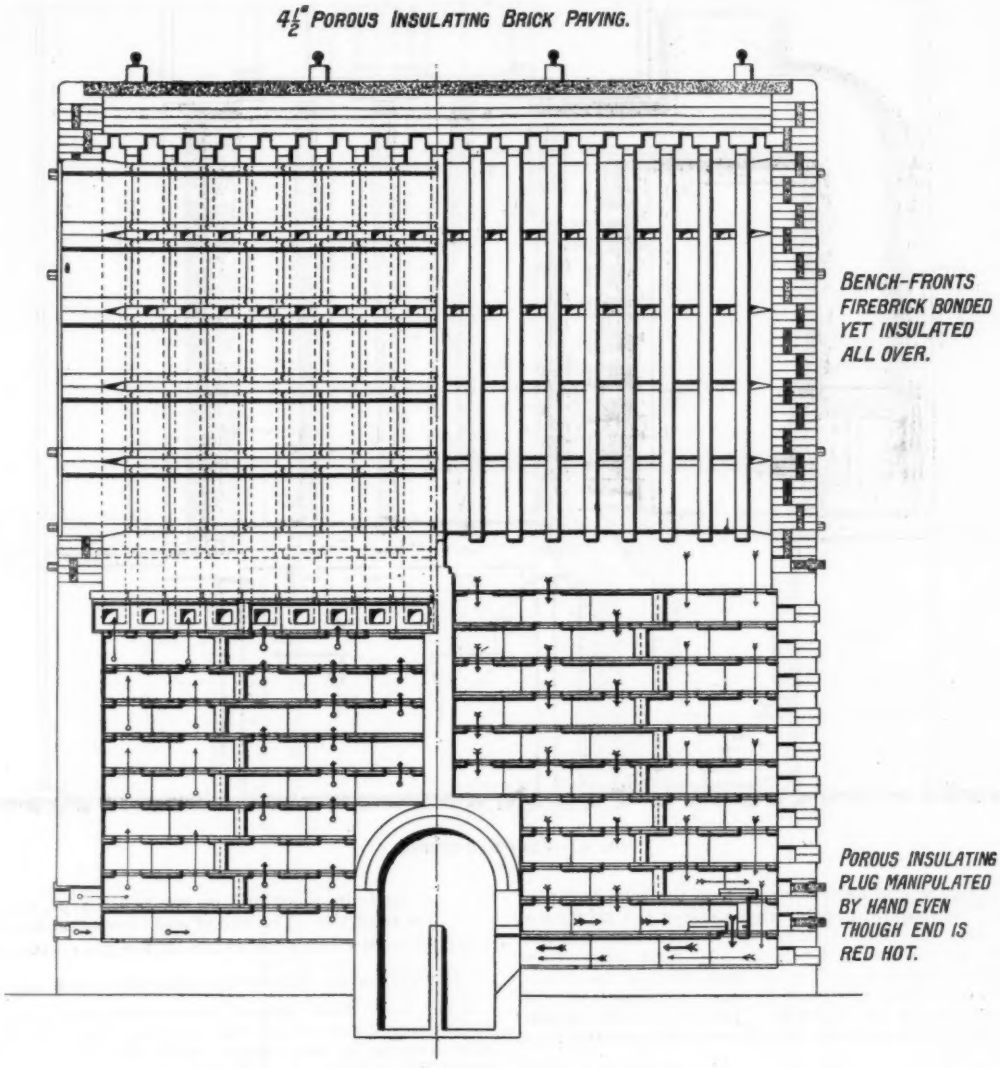

4½" POROUS INSULATING BRICK PAVING.
BENCH-FRONTS FIREBRICK BONDED YET INSULATED ALL OVER.
POROUS INSULATING PLUG MANIPULATED BY HAND EVEN THOUGH END IS RED HOT.
'DEMPSTER–TOOGOOD' MODERNIZED HORIZONTALS.

FIG. 5.—INSULATION OF RETORT SETTINGS.

THERMAL INSULATION OF VERTICAL RETORT BENCHES.

By reason of specific factors peculiar to the structural conception of vertical retort benches, continuous vertical settings lend themselves admirably to features of design arranged to ensure a maximum economy of fuel consumption. With the continued attention focussed on the question of thermal efficiencies, it may well be said that the latest types of verticals are well advanced in this respect.

Hardie concluded that only 31 p.ct. of the heat supplied to the producers was actually expended in a modern, insulated continuous " W-D " setting at the Bow Common Works of the Gas Light and Coke Company.

In the thermal balance of a modern type of insulated horizontal setting reported by the same author, 55·5 p.ct. of the heat supplied to the producers was calculated to be consumed in the setting itself—an excess of 24·5 p.ct. over the corresponding figure for the modern vertical settings. However, it should be recalled that in the continuous vertical plant on which the above figure was obtained, provision is made for:

(*a*) Utilizing the heat of the coke in the production of water-gas within the retort.

(*b*) Abstracting the sensible heat from the hot gas, by causing it to heat the cold coal entering the retort.

Hence, the heat losses by radiation and convection from a vertical retort setting may be much larger than mere comparison of the 31 p.ct. " heat used in setting " figure, with the 55·5 p.ct. figure for the horizontal, would indicate.

In reply to questions regarding the advantages of thermal insulation on vertical installations, &c., we have received the following observations.

WEST'S GAS IMPROVEMENT COMPANY.

The principal advantage of the use of insulating materials in the manner shown on the Glover-West vertical retort bench (fig. 6) is the greater comfort for the men operating the plant.

A further advantage of the insulation upon the top of the bench is that it reduces the effect of radiation on the gas off-take pipes, and minimizes troubles with the condensates. The effect of insulation upon fuel consumption is very difficult to determine with any degree of accuracy. It is nearly impossible to compare the conditions of a given installation before and after insulation; and to compare two different installations is to introduce factors for which accurate allowance cannot be made. At the same time, there is no doubt that economy is effected; and we are of the opinion that it is of the order of 5 p.ct. of the fuel consumption—*i.e.*, of the order of 0·75 lb. of coke per 100 lbs. carbonized.

Mr. J. F. West, of the above Company, observes that the comparatively soft insulating material on the top of the setting tends to be cut up and destroyed by falling coal or coke, and such like happenings.

An advantage is obtained on the top of the setting by placing the insulating bricks one course below the top course, covering them with ordinary bricks. This enables the top to be more effectively grouted in when necessary.

It is not usually desirable to build up the external wall insulation before " drying out " and " heating up," since any cracking which occurs during the preliminary heating cannot be pointed, which may cause lack of heat control and inefficiency of working. Further, in the case of externally-insulated settings, fluctuations in the combustion chamber temperature may cause movement with undesirable effects on the wall of insulating material.

WOODALL-DUCKHAM COMPANIES.

The settings vary so much in arrangement that nothing can be taken as typical; but it can be stated that the Woodall-Duckham Companies are using insulation wherever it is practicable to use it, both on the tops and also vertically. The type of insulation also varies, and includes Moler brick, special insulating firebrick, slag wool, hollow blocks, Silocel, and insulating cement of the magnesia type. It is impossible to say to what extent there has been heat saving by use of thermal insulation. Finality has by no means been reached, and an

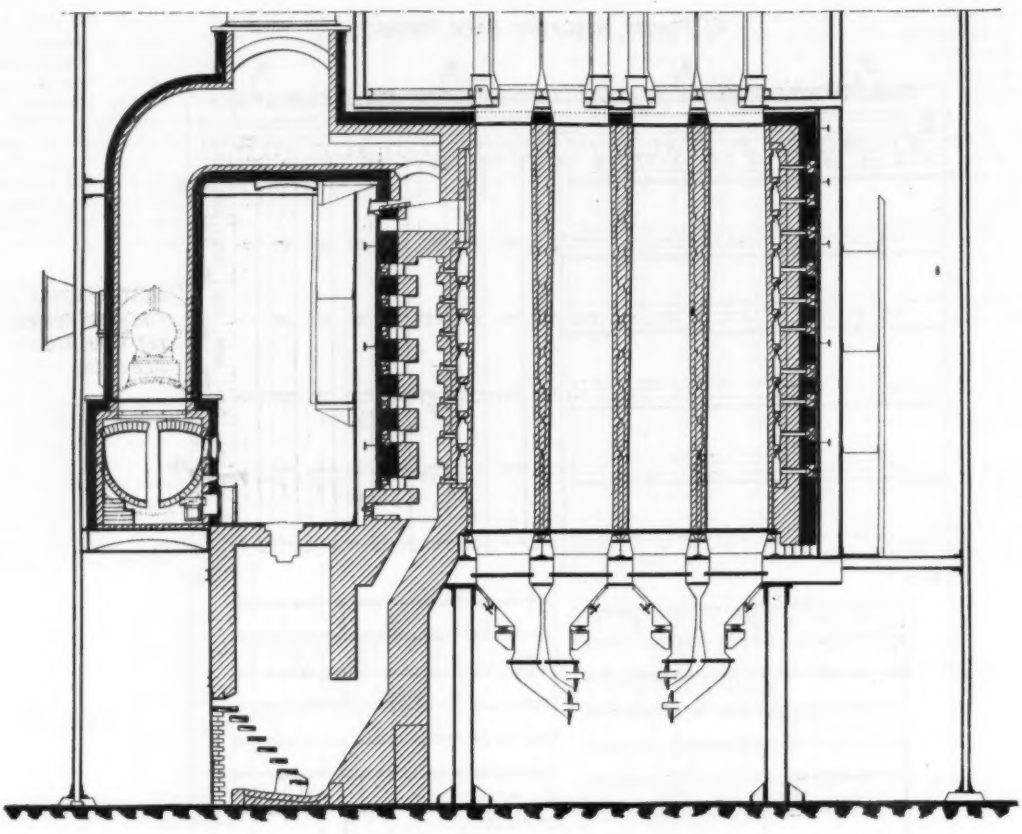


FIG. 6.—WEST'S SETTING.

approximate figure would be under 5 p.ct. of the coke burnt in the producers. It is quite possible that savings can be shown much higher than this, and this depends on the losses that are incurred when no insulation is used at all. Such losses vary with the design of settings; and in any case, without insulation the heat losses on these settings can be taken as being less than 10 p.ct. of the coke in the producer. The Woodall-Duckham installations now being built are being materially insulated (see fig. 7).

From what has been recounted above, it would therefore appear that insulation of vertical benches, as at present achieved, may result in the following advantages:

(1) A fuel economy of around 5 p.ct. of weight of coke charged into the producers.

(2) A noteworthy improvement of atmospheric conditions around the plant and on the bench tops, consequent on the reduction of radiation and convection losses.

(3) Reduced effect of radiation on the gas off-take pipes.

INSULATION OF WASTE GAS AND PRODUCER GAS MAINS.

Apart from those thermal losses which may arise directly by radiation and convection from the retort bench itself, considerable decrease in the thermal efficiencies of plants fitted with waste-heat boilers or external producers can occur unless the gas mains themselves are efficiently lagged. As J. S. Thorman ("GAS JOURNAL," Nov. 28, 1923) has already emphasized, such a loss from a main, lined only with a single thickness of firebricks (6 in. thick), might reduce estimated steam production by the waste gases from 1300 lbs. to 975 lbs.

In a series of actual trials with a small section of the main prepared for purposes of experiment, Thorman determined the

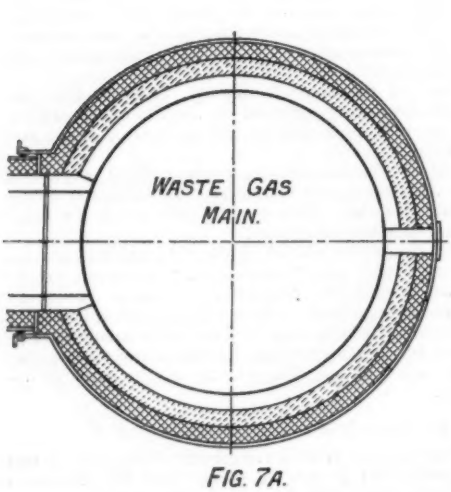


FIG. 7A.

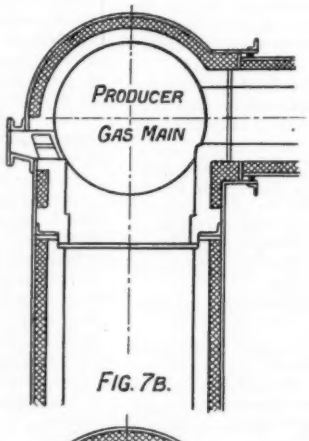


FIG. 7B.

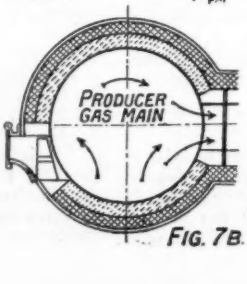


FIG. 7B.

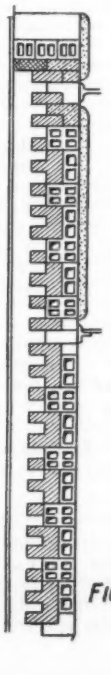


FIG. 7C.

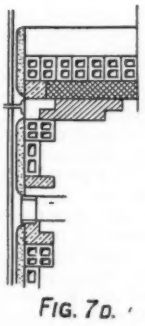


FIG. 7D.

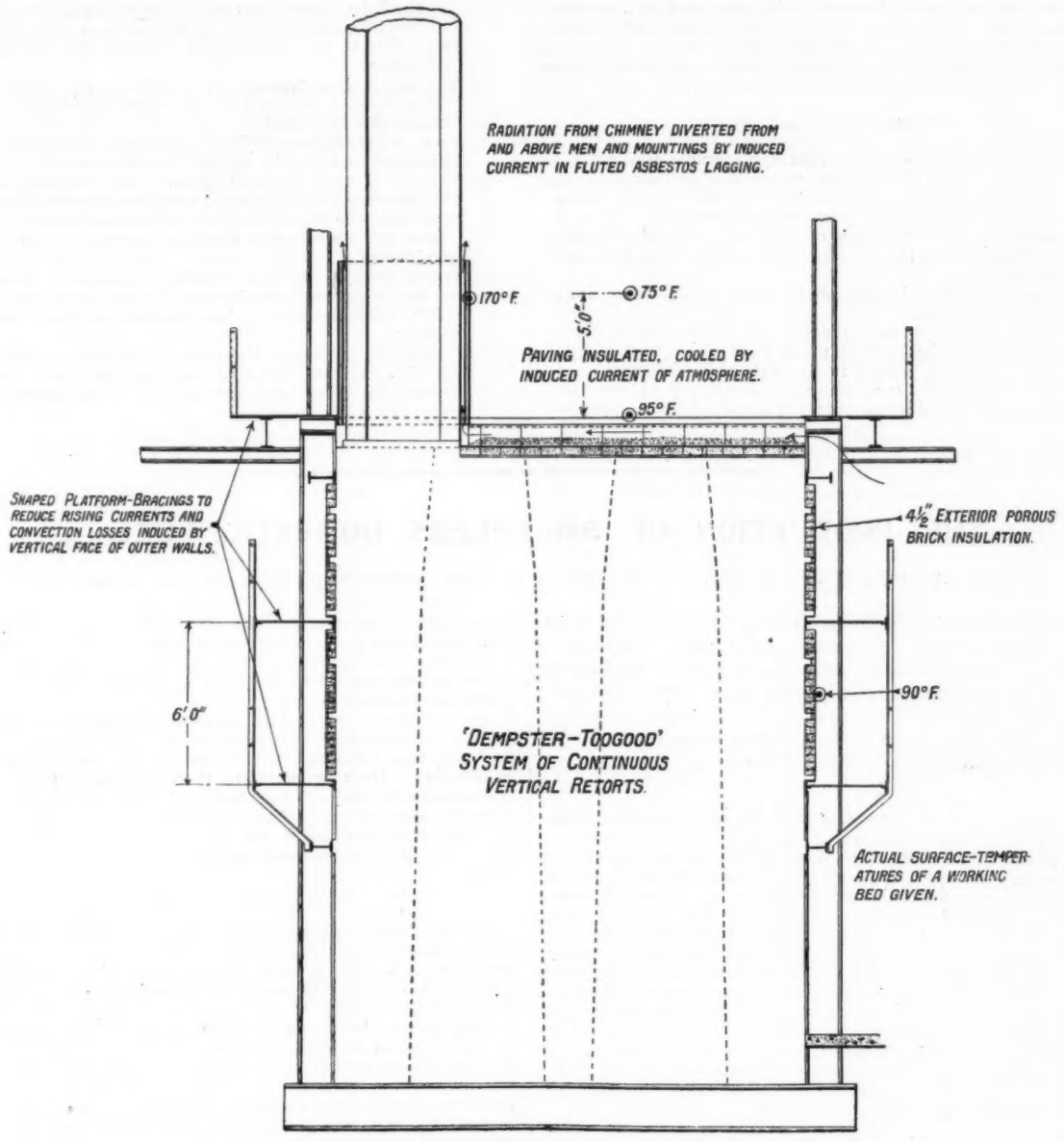

RADIATION FROM CHIMNEY DIVERTED FROM AND ABOVE MEN AND MOUNTINGS BY INDUCED CURRENT IN FLUTED ASBESTOS LAGGING.
170° F.
75° F.
5'0"
PAVING INSULATED, COOLED BY INDUCED CURRENT OF ATMOSPHERE.
95° F.
SHAPED PLATFORM-BRACINGS TO REDUCE RISING CURRENTS AND CONVECTION LOSSES INDUCED BY VERTICAL FACE OF OUTER WALLS.
4½" EXTERIOR POROUS BRICK INSULATION.
6'0"
90° F.
'DEMPSTER-TODGOOD' SYSTEM OF CONTINUOUS VERTICAL RETORTS.
ACTUAL SURFACE-TEMPERATURES OF A WORKING BED GIVEN.

FIG. 8.—INSULATION OF RETORT SETTINGS.

external face temperatures with various types of linings, keeping the thickness at 6 in.

With 6 in. of firebrick lining and no insulation, the temperature was 360° Fahr., and the maximum reduction in external temperature was obtained when 3 in. of Stourbridge firebrick was used in conjunction with 3 in. of a porous diatomaceous insulating brick, the temperature then being 157° Fahr. Other materials, replacing the diatomaceous brick, were tried, and these were classified in the following order of increasing effectiveness: (*a*) Solid insulating diatomaceous brick; (*b*) asbestos brick; (*c*) magnesia insulating brick; (*d*) porous kieselguhr insulating brick, the latter being the best insulator of these four products.

Fig. 7A illustrates the section of a waste-gas main of a Woodall-Duckham installation, showing the outer layer of porous diatomaceous brick, enclosed in the metal casing. Fig. 7B illustrates, in cross and longitudinal sections, the relative thicknesses of insulating brick and firebrick included, for heat retention purposes, in the producer gas mains.

As already stated, a fall in gas temperature in the producer gas main of 50° C. will correspond approximately with a loss of 1 p.ct. of fuel put into the producer.

LOCATION AND TYPES OF INSULATION USED ON VERTICAL BENCHES.

In general, it may be said that the present practice in vertical retort construction is to apply insulation whenever possible. Further, the general procedure at present would appear to introduce the insulation as an external blanket to the radiating faces.

Regarding Dempster practice in vertical retort construction, as applied at the Elland Works, the following is descriptive.

"As will be seen from the illustration, fig. 8, the setting is built with firebrick headers projecting 3 in. After the heats are up, and expansion is virtually completed, all joints are pointed and a 4½-in. thickness of porous insulating brick is built exterior to the setting, the headers forming sufficient key to tie the insulation firmly to the setting. On the bench-tops above the firebrick setting proper is placed a ¾-in. mat of asbestos fibre, which is surmounted by a 3-in. course of non-conducting, porous insulating brick. Superimposed on the latter is a layer of firebrick tubes, half filled with sand, open to the atmosphere, and placed in connection with the chimney lagging. The upper surface is paved with a hard red brick to resist wear. Thus the hollow chimney lagging induces a circulation of atmosphere through the tubes, so that the paving is cooled to reasonable comfort."

The Bow Common W-D setting is interesting on account of the ingenuity exerted to obtain maximum insulation effect, and also by reason of the variety of insulating brickwork employed. Fig. 7C represents a section through the wall of the setting showing also the position of the inspection platforms and the retort top. The outer wall is constructed of 9-in. hollow blocks, square on one face and 4½ in. thick, each containing four channels packed with slag wool. Opposite the inspection platforms, in order to ensure more comfortable conditions, a layer of asbestos composition has been applied to the wall, after the setting was at working temperatures. At the top of the retort, just below the hollow blocks, is placed a 4½-in. layer of porous insulating brickwork. Fig. 7D illustrates a similar disposition of various types of heat insulating composition or brickwork on another wall of the setting.

During our inspection of various insulated vertical settings, one point of interest which may also be of importance has been disclosed—namely, that the application of thermal insulation to one portion of a setting after heats are up will ameliorate atmospheric conditions opposite that position, but appears to increase

radiation and convection losses at points remote from the newly insulated part. It therefore appears that, as with horizontals, insulation of any parts of verticals should not be attempted without due consideration of the possible effects of such insulation on adjacent or even distant metal work.

SUMMARY AND CONCLUSIONS.

(1) There is much evidence that considerable fuel value is lost by way of the walls of gas-making installations, and further, that this loss increases considerably with the use of higher combustion chamber temperatures. Thus the trend of modern design of both vertical and horizontal settings makes the use of adequate methods of insulation a necessity.
(2) The loss of heat by way of the metal work of a setting is surprisingly high.
(3) A discussion of the properties of insulating materials shows that the product made from diatomaceous earth has a wide application in the carbonizing industry.
(4) It is shown that a preconceived disposition of insulating materials based on an appreciation (*a*) of their properties, (*b*) the behaviour of the refractory in the setting, (*c*) the peculiarities and functions of the plant, is very desirable.
(5) Insulation as an afterthought requires very careful consideration.
(6) The thermal advantages of insulation vary with many circumstances, but are in many cases appreciable. Other advantages are noted.
(7) Some interesting methods of arranging the insulation are discussed and certain suggestions advanced.
(8) The use of large, tongued-and-grooved insulating slabs is recommended in the place of bricks of normal size. In this way the heat losses by radiation through opened joints, or by conduction through jointing cement, will be diminished.
(9) When design involves external insulation, there are strong arguments for building-in the insulating brickwork after the setting has attained working temperatures.
(10) Conflicting reports on the effect of aluminium paint, &c., on the emissivity of radiating surfaces have been received, but discussion thereon has been deferred to a later date.

THE PRODUCTION OF SMOKELESS DOMESTIC FUEL.—I.

By JOHN ROBERTS, D.I.C., M.I.Min.E, F.G.S., Author of "Coal Carbonization: High and Low Temperature."

Industrialists and financiers are taking a keen interest in the subject of smokeless fuel production, and a section of the public is looking forward to the day when the fuel will be available in sufficient quantity and at a reasonable price. It is, therefore, considered opportune to review the situation, and to present a reasoned statement of the position in such a manner as will, it is hoped, be of guidance to those interested.

OVEN COKE.

For over a century smokeless fuel has been produced commercially from bituminous coal at gas-works and at coke ovens. That produced in coke ovens was mainly manufactured for metallurgical purposes, and formerly it was rarely the intention to erect ovens for domestic fuel manufacture. In recent years, however, owing to depression in the iron and steel industry, coke-oven managers have been compelled to produce coke suitable for purposes other than smelting; and much graded oven coke now finds its way into the market for central-heating purposes, bakeries, &c. This market was formerly monopolized by the gas companies, who thus disposed of the coke which was the residue after the extraction of the gas from the coal. The next step to be taken by the coke-oven operators will be the manufacture of free-burning coke for the open grate; and there is reason to believe that such a step will be taken this year, as will be discussed in a subsequent article.

GAS COKE.

Neither furnace coke nor gas coke, as generally made, is eminently suitable for general use in the ordinary domestic open firegrate. It is true that dry gas coke, when suitably graded, may be used more or less satisfactorily in open grates; but the writer's experience has been that not only must the grate be properly designed, but weather conditions must also be favourable. If the barometric pressure is above 29·5 in., some of these fuels burn well, but, unfortunately, a fall in the barometer is generally immediately reflected in the coke fire, and the fire becomes dull under depressing atmospheric conditions, when a bright fire is most needed. Graded gas coke, however, should be more extensively used, as it would be if it were always supplied in a dry condition, or at least with a low moisture content.

A further objection often urged against coke in the open grate is the fumes given off. This trouble generally arises from defective chimney draught, and as the latter depends, to a certain extent, on the "pull" created by the fire, the remedy lies in producing a fuel having the property of ready combustibility. That gas coke does not entirely meet the requirements of the householder is evidenced by the fact that specially-designed grates are now being marketed to render the fuel usable without difficulty, and some of these have proved particularly successful. It will be shown later that gas companies also can manufacture the desired domestic fuel.

LOW-TEMPERATURE CARBONIZATION.

The disadvantages of ordinary coke led investigators to seek other means of producing a fuel which would ignite as readily as coal, give a cheerful glow under ordinary draught conditions, and at the same time be smokeless. In this quest it was soon discovered that the residue after the distillation of coal at temperatures much lower than those employed at gas-works was generally a better domestic fuel than the coal from which it was made, and in the process a higher yield of liquid products, such as tar oils, was obtained. Thus one of the earliest workers on this problem, a German named Becher (about 1680) found that "the coal from which the tar has been taken out is better for use than before." Other workers have invariably confirmed Becher's view.

Until recently, the best domestic fuels were those produced at low temperatures; and, provided they were properly manufactured from a coal of low ash content, they would give entire satisfaction. It is unfortunate that producers, having once introduced this fuel, almost invariably resorted to the use of inferior coals, which yielded semi-cokes containing such objectionable proportions of ash that even the most ardent supporters of the smoke-abatement movement could not tolerate them.

SLOW DEVELOPMENT.

The proposal to distil coal at low temperature, as already indicated, was made long before the birth of the gas and coking industries. It was revived in 1850 by James Young, the founder of the Scottish shale-oil industry, who, however, restricted his activities to oil shale after his discovery of the economic and commercial possibilities of oil shale distillation. In 1906, the late T. Parker introduced his process for the manufacture of the product now known as "coalite," using approximately the same temperature for carbonizing the coal as had been proposed by Young; and though Parker's successors and others have been engaged on the problem ever since, the amount of smokeless semi-coke produced is still almost negligible in relation to total domestic needs.

TECHNICAL DIFFICULTIES OF LOW-TEMPERATURE CARBONIZATION.

In the ordinary high-temperature processes of coal carbonization, the temperatures employed range from 900° to 1000° C. These are carbonizing temperatures—the flue temperatures range from 1000° to 1400° C. In low-temperature processes the carbonizing temperature generally does not exceed 600° C. It was at first thought that it would be an exceedingly simple matter merely to lower the temperature at which coking should be carried out, but it was soon discovered that two difficulties arose. In the first place the low temperature gradient resulted in a much slower rate of heat penetration. Secondly, the charges of coal expanded during carbonization, and consequently were removed only with difficulty from the retorts or carbonizing chambers. That the latter trouble was not experienced in high-temperature practice was due to the fact that contraction of the charge took place when heated at temperatures higher than 700° C., and this contraction facilitated the discharge of the coke.

For several years, therefore, efforts were directed towards designing retorts which would enable the coal to be coked in a reasonable time, and allow the charge to be removed easily at the end of the coking period. Thus, Parker proposed in 1907 to carbonize coal in tapered tubes 5 to 6 in. in diameter, and Tozer later introduced ribs into the tubes to facilitate heat transmission. For a long while this system was abandoned in favour of retorts of other designs. One of these was provided with collapsible plates, which held the charge in position during the coking period, but which could be brought together later to allow the charge freedom of movement. This system was in turn abandoned. Other inventors proposed to overcome the difficulty of slow heat penetration by heating the charge internally, while maintaining it in constant motion, employing the system adopted in calcining kilns. Some of these systems

have proved more or less successful with certain types of fuel, while others are now in course of development.

II.

HOW TECHNICAL DIFFICULTIES WERE SOLVED.

Shortly after the Great War the low-temperature problem was attacked from a totally different standpoint. It was considered simpler to prepare the coal in such a manner that it would accommodate itself to the retort, rather than make the retort accommodate itself to the coal. In a research on this question it was observed that the swelling, or expansion, of the coal during carbonization was due to the fact that the coal contained or produced more binding material than was required to cause the particles of slack to cohere and form a coke. Those coals which yielded no surplus binder did not expand, and could be carbonized without difficulty; but the supply of such coals is limited. Other coals would not cohere at all, and on carbonization these yielded an incoherent residue. Large supplies of coals of this class are available, some containing high percentages of volatile matter, and others low proportions.

Another feature noted in these experiments was the fact that the actual conversion of the coal into coke was accompanied by the formation of a spongy mass, known as the plastic layer, which itself also proved a bar to heat penetration. It was desirable to eliminate this.

BLENDING COALS.

Two alternative solutions were thus presented: (1) The excess binder of a strongly-coking coal should be utilized to cement non-coking fuel. (2) The excess binder might be reduced prior to carbonization, either by a preliminary distillation or by oxidation. The first plan could be adopted by mixing, or blending, with the coking coal inert coke dust or non-coking coal. When this plan was tried it was found that swelling of the charge was entirely prevented, and the resulting fuel was more homogeneous and of more uniform texture than that made from an unblended coal.

The troublesome plastic layer would not develop under these conditions, and it was observed that heat penetration was considerably improved as a result. On the face of things, this plan seemed to offer a simple remedy; but certain objections were foreseen. Coke breeze is usually high in ash, and if breeze from an outside source were brought in to a given plant, the semi-coke might contain too large a proportion of ash; while if the system were generally adopted the supply of breeze would be found insufficient. At the same time it offered a means of rendering an almost worthless fuel marketable.

The natural development was the proposal to use non-coking coal, either low-volatile coal or high-volatile coal. Anthracitic coals proved to be suitable except that the yield of gaseous and liquid products was reduced. Here again the supply of the inert material is somewhat limited. Hence non-coking coals of high volatile content were tried. These proved to be eminently satisfactory for the purpose, and incidentally a new type of fuel was discovered, which will be referred to in a subsequent article.

The advantages of blending, therefore, proved to be the entire elimination of the plastic layer, the prevention of expansion, improvement in heat penetration and consequent hastening of the carbonization process, and the production of a fuel much less spongy and bulky than that formerly produced in low-temperature processes.

PREHEATING PROCESSES.

The second means of eliminating the plastic layer consists in reducing the excess binder (*a*) by a preliminary distillation in the absence of air at about 440° to 640° C., as proposed by Parr and Olin in 1912, and by C. H. Smith, the inventor of the "Carbocoal process," in 1915; (*b*) by oxidizing the coal at temperatures ranging from 100° to 300° C., as proposed by the writer in 1920. In both systems the binder can be reduced to such an extent that the coal no longer swells during the carbonization process proper, the semi-coke becomes remarkably uniform in texture, and heat transmission through the charge is speeded up in this case also. Blending and preheating processes, therefore, overcome the obstacles met with by the pioneers in low-temperature carbonization. Consequently, where advantage is taken of these methods, the prospects of the processes in which they are employed are usually brighter than where a "straight" coal—that is, an unblended or untreated coal—is employed.

PARTIAL DISTILLATION PROCESSES.

The "Carbocoal" process (B.P. 101,539, 1915) was devised by C. H. Smith in order to reduce the moisture and volatile contents of the coal so that an improved coke would result when the coal was subsequently carbonized in coke ovens. Later, he described processes (B.P. 111,285 and 125,379) for making smokeless fuel from coals which had been preheated at from 825° to 1200° Fahr. A somewhat similar process was later patented by S. R. Illingworth, who proposed preheating coals at temperatures up to 500° C. (932° Fahr.), and subsequently carbonizing at temperatures up to 1000° C. Illingworth has also been interested in blending, chiefly with low-volatile non-coking coals, but at the Treforest plant preheating forms part of the process. It is carried out as follows: A charge of hot coke is dropped from the retort into a cylindrical drum containing a charge of coal. The closed drum is then revolved for a short while, during which time the moisture is driven off from the coal, and the coke is cooled. Naturally, some of the coal is also partially distilled. The mixture is then screened, and the coal, mixed with fine semi-coke, is elevated to the top of the bench and there charged into the retort. It will be seen, therefore, that this system combines coke breeze blending and preheating.

THE ILLINGWORTH SYSTEM.

In the Illingworth system carbonization is carried out in vertical firebrick retorts, 12 ft. high, 9 ft. 6 in. in length, and 14 in. in width. Each retort is divided into a number of compartments by means of H-section cast-iron girders placed vertically in the retort. The object of these girders is to facilitate heat penetration. Obviously, the capacity of the retort is reduced by this means, but the coking operation is completed in 5½ hours—a much shorter time than would be taken without the aid of the cast-iron conductors.

The yields claimed from a 35 p.ct. volatile coal with 5½ p.ct. of moisture, as published in "Colliery Engineering," September, 1927, were as follows: Fuel 81 p.ct., tar oils 16 gallons, gas 7000 c.ft. of 620 B.Th.U. per c.ft., benzole 2 gallons. The calorific value of the fuel is 13,500 B.Th.U. per lb. It is not stated whether the 81 p.ct. of coke includes the breeze returned to the retort. In any event, for a coal of such high volatile content the figure 81 p.ct., or 16 cwt. per ton of coal, is on the high side. In this connection it should be pointed out that the author of the description from which the above figures are taken stated that: "From the average Welsh coal, where the volatile is not over 20 p.ct., about 16 cwt. of smokeless fuel are obtained, about 6 to 8 gallons of oil, and about 6500 c.ft. of gas per ton of coal. With higher volatile coals about 14 cwt. of fuel, 18 gallons of oil, and 7500 c.ft. of gas are obtained." Yet a high-volatile coal is said to yield 16 cwt. of smokeless fuel.

The fuel is known by the trade name of "Ricoal," and it is claimed that "it is even equal to the South Wales best steam coals." We are, however, unable to reconcile that claim with the above-mentioned calorific value of the fuel, having in mind also that the ash content of the original coal quoted by way of example was 6·89 p.ct., which would give an ash content of 8 p.ct. in the smokeless fuel.

A balance-sheet, which is stated to be based on actual market results, and a coal of 34 p.ct. volatile, gives the value of the fuel at works at 37s. 6d. per ton, and the yield 15 cwt. per ton. Where the supply is limited to about 50 tons per day, as in the case in question, it ought to be possible to obtain that price for local sale, and the fuel is probably good value; but it is evident that a fuel costing 37s. 6d. at works will not stand heavy transport charges. There is no reason, however, why the fuel should not give greater satisfaction to domestic consumers than does house coal, since, in common with other smokeless fuels, its radiant efficiency would be about 25 p.ct. higher than that of coal. It should be comparatively free from moisture, provided the coke does not absorb the moisture from the coal, so that less heat is wasted in evaporating moisture in the grate. Its smokelessness would prove a boon to householders.

PROCESS YIELDS OF PRODUCTS.

The yields of products obtained in the Illingworth process may be compared with the average yields obtainable at various temperatures. The following figures are based on a coal having about 33 p.ct. of volatile matter.

Product.	Low Temperature. Below 600° C.	Medium Temperature. About 750° C.	High Temperature. 900° C. and Above.
Coke, cwt.	15	14·5	14
Gas, c.ft.	4000 to 5000	8000	10,000 to 12,000
Tar, galls.	18 to 22	14 to 18	10 to 12
Ammonium sulphate, lbs.	12	15	30
Benzole, galls.	2 to 2½	2 to 3	2 to 3

As a rule, the yield of ammonium sulphate is too small, when operating below 600° C., to warrant the installation of recovery plant; and though yields of two gallons of benzole are often claimed, they are rarely obtained. Even in high-temperature practice, with Welsh coals, only in one or two instances has it been found profitable to instal benzole recovery plant. This is because it is common practice to mix the low-volatile steam coal slacks with the normal coking coals. In other districts the high-temperature yields given in the above table are commonly obtained in practice. Where steaming of retorts is resorted to in gas-works, the yield of gas is about 25 p.ct. higher. Where the average carbonizing temperature has been about 800° C., it has been found practicable on a regular works scale to obtain 10,000 c.ft. of gas, without steaming, and 10 gallons of tar from a coal of slightly higher volatile content than 33 p.ct. Under these conditions a readily-ignitable fuel possessing remarkable combustible properties was obtained, to which reference will be made in a subsequent article.

FORTHCOMING ENGAGEMENTS.

July 9-12.—ASSOCIATION OF PUBLIC LIGHTING ENGINEERS.—Annual meeting and conference in Sheffield.

July 10.—NATIONAL GAS COUNCIL.—Meeting of the Central Executive Board.

July 13.—MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.—Quarterly Meeting at Leek.

Aug. 14-15.—IRISH ASSOCIATION OF GAS MANAGERS.—Annual conference in Belfast.

Oct. 22-24.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual Conference at York.

THE INSTITUTION OF GAS ENGINEERS.

All meetings take place in the Council Room at 28, Grosvenor Gardens, unless otherwise stated.

July 10.—Gas Education Committee.

July 16.—Emergency and Finance Committees and Benevolent Fund Committee of Management in the morning; Royal Charter Committee meeting and Council meeting in the afternoon.

Sept. 10.—Emergency and Finance Committees and Benevolent Fund Committee of Management in the morning; Council meeting in the afternoon.

Oct. 8.—Emergency and Finance Committees in the morning; Council meeting in the afternoon.

Oct. 9.—Gas Education Committee.

Nov. 12.—Emergency and Finance Committees in the morning; Council meeting in the afternoon.

Nov. 13.—Executive Committee of Gas Education Committee.

Dec. 10.—Emergency and Finance Committees in the morning; Council meeting in the afternoon.

Dec. 11.—Executive Committee of Gas Education Committee.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Llandudno Urban District Council Bill: Read the third time, with the amendments, and passed; returned to the Commons.

South Suburban Gas Bill: Read a second time, waiting for committment.

Windermere Gas and Water Bill: Read the third time, with the amendments. Further amendments made. The Bill passed, and returned to the Commons.

Bollington, Maryport, and Shirebrook and District Gas Orders: Referred to the Special Orders Committee.

Shirebrook and District Gas Orders: Laid before the House, and referred to the Special Orders Committee.

Tottenham and District Gas Bill, Bournemouth Gas and Water Bill, and Dover Gas Bill: Sent to the Commons.

South Metropolitan Gas Bill and York Town and Blackwater Gas and Electricity Bill: Awaiting Royal Assent.

HOUSE OF COMMONS.

Progress of Bills.

Windermere Gas and Water Bill: Returned from the Lords, agreed to, with amendments.

Llandudno Urban District Council Bill: Lords amendments considered, and agreed to.

Bournemouth Gas and Water Bill: Returned from the Lords, reported, with amendments.

Weald Electricity Supply Bill: Second reading deferred till to-day.

St. Ives (Hunts.) and United District Gas Orders: Approved.

Hinckley, Ormskirk, Southend-on-Sea and District, St. Ives (Hunt.), United District, and Weston-super-Mare Gas Orders: Approved.

Bollington and Maryport Gas Orders: Copies presented.

Dover Gas Bill: Read a second time, and committed.

South Metropolitan Gas Bill and York Town and Blackwater Gas and Electricity Bill: Royal assented.

DUDLEY CORPORATION BILL.

This Bill, which has been considered recently by Section A of the Local Legislation Committee of the House of Commons (presided over by Sir Thomas Robinson), seeks to confer upon the Dudley Corporation various powers, including power to carry out street works. The Dudley Gas Company, in order to obtain protection against any interference with, or damage to, their mains and apparatus which might result from the carrying-out of the proposed street works, petitioned against the Bill, and as a result a clause giving the Company the necessary protection has been agreed upon between the parties.

This clause provides that, before executing any authorized works within 10 ft. of the Company's apparatus, the Corporation are to give the Company fourteen days' notice, and to deliver plans and sections. The work is not to be executed except in accordance with the plans and sections as approved, or as determined by arbitration. If it appears to the Company that the execution of the authorized works will interfere with, or endanger, the apparatus, or interfere with access to it, or impede the supply of gas, the Company may within the fourteen days give the Corporation notice to alter the position of such apparatus as may be reasonably necessary. This work is to be carried out at the expense of the Corporation and to the reasonable satisfaction of the Company's engineer, and under his superintendence if he thinks fit to attend, after receiving not less than three days' notice, which the Corporation are required to give.

Apparatus is not to be removed or endangered, &c., without the consent of the Company, or in any manner other than the Company shall approve, until other apparatus has been substituted at the expense of the Corporation. If any apparatus, other than that for which new apparatus has been substituted, is rendered derelict, useless, or unnecessary by the carrying-out of the street works, the Corporation are to pay the Company the value of it, and the expense of cutting it off from the supply system. If by reason of the carrying-out of the street works the replacement of old apparatus or any addition to the existing apparatus is rendered reasonably necessary, it is to be provided by the Corporation and laid and connected at their expense in such position as may reasonably be required by the Company.

The Corporation are to make good all damage done by them in executing any authorized work, and to make compensation to the Company for any loss (other than loss of revenue), damage, costs, or expenses sustained by reason of interference with the apparatus or access thereto, or with the private service pipes of consumers.

There is also a provision giving the Company the right themselves to carry out the alteration of position, removal, displacement, &c., at the expense of the Corporation, on giving the Corporation seven days' notice. Differences are to be settled by arbitration.

BOURNEMOUTH GAS AND WATER COMPANY'S BILL.

This Bill, which relates to both the gas and water undertakings of the Company, was before the Unopposed Bills Committee of the House of Commons (presided over by Mr. J. Fitzalan Hope, Chairman of Ways and Means) on Thursday last. The Company seek power to extend the limits for the supply of gas to a comparatively small extent, and to increase their capital and borrowing powers. (See "JOURNAL" for Jan. 11, p. 91.)

Mr. C. E. C. BROWNE (Messrs. Dyson, Bell, & Co., Parliamentary Agents) said the Company asked for power to raise a further £350,000 of capital, with 50 p.ct. borrowing powers, and to increase the existing borrowing powers to the same proportion of the existing capital. There was a clause in the Bill by which it was proposed to give district councils within the area of supply for gas and water the right to guarantee to the Company a return on the capital outlay involved in the supply of those districts. So far as the supply of water was concerned, there were many precedents for such a clause; but as to the supply of gas, there was only one precedent of which he was aware, and that was in the Act secured by the Coventry Corporation last session. This gave the district councils within the Corporation's gas limits, but outside the borough, the right to guarantee a return on the capital outlay involved in extending the mains for supplying those outside districts. The Ministry of Health, in a report on the Bournemouth Company's Bill, had stated that the granting of the clause referred to would enable a district council to impose a charge on the large body of ratepayers in order to bring into a district a commodity which could be used perhaps only by some ratepayers. Apart from the fact that a district council might wish to exercise these powers for the purpose of obtaining a supply of gas for public lighting purposes, it seemed rather hard, and perhaps a little retrograde, to suggest that a district council should not be entitled to incur a liability of this kind if in its wisdom it conceived it to be in the general interests of the district. It might be that there would be no actual payment; but, on the other hand, the council might very properly say that it would be in the best interests of the district that the supply should be made available, and that if it could not be made available by other means than by giving a guarantee they were justified in giving the guarantee. The suggestion of the Ministry seemed to be founded on the presumption that any ratepayer should not be called upon to pay for more than the service which he himself enjoyed. It hardly needed argument, however, that in very many branches of local authority expenditure there were ratepayers who were not concerned with the proceeds of that expenditure, but, nevertheless, as members of the community, it was their duty to contribute to it. For example, not every ratepayer was personally or financially benefited by the erection of dwellings under the powers of the Housing Acts, and there were countless other objects on which local authorities expended money which did not benefit directly every one of the ratepayers. It seemed to be taking a parochial, as contrasted with an Imperial, view to say that because a local authority was making expenditure which would not benefit every one of the ratepayers it should not make that expenditure.

The Committee's decision was that this unusual power should not be allowed so far as gas was concerned; and the clause was amended accordingly.

The Bill was ordered to be reported for third reading.

LEGAL INTELLIGENCE.

"SILENT KNIGHT" AND "RED KNIGHT" GAS FIRES.

In the Chancery Division on Thursday and Friday, Mr. Justice ASTBURY heard an action in which the Forth and Clyde and Sunnyside Iron Company, Ltd., of Falkirk, sued W. Sugg & Co., of Ranelagh Works, Chapter Street, Westminster, seeking an injunction to restrain them from infringing their trade-mark in the words "Silent Knight" for gas fires and from selling, or offering for sale, or advertising gas stoves not of the plaintiffs' manufacture, as "Red Knight" stoves, and using in connection with such gas stoves any expression which included the word "Knight," or any device of a Knight in any manner calculated to lead to gas stoves being passed off as plaintiffs' when they were not of plaintiffs' manufacture. The defendants denied the alleged infringement and passing-off.

Sir DUNCAN KERLY, K.C. (for the plaintiffs), said that his clients and the defendants had obtained registration of their marks, and each attacked the registration of the other. The plaintiffs some time ago introduced a new form of gas fire of the inset type which met with considerable success. It was called the "Silent Knight," and was advertised as such. Subsequently the defendants put on the market and advertised an inset gas stove called the "Red Knight;" and, besides the name, they had a device of a chessman Knight, coloured red. The plaintiffs objected on the ground that the similarity of the name would cause confusion; and eventually the plaintiffs met defendants on the footing that, if the latter would remove the words "Red Knight" from their application for registration, the plaintiffs would not oppose the application and defendants would merely register a black chessman. Six months afterwards, however, the defendants' advertisement re-appeared with "Red Knight" as the most prominent part of it.

Mr. *John A. Brown*, Joint Managing Director and Secretary of the plaintiff Company, said the "Silent Knight" was adopted in 1925, following a suggestion of their North Country representative.

Cross-examined by Mr. JENKINS, K.C. (for the defence), he said that one of the characteristics of their gas fire is that it was silent in operation; but the words "Silent Knight" had nothing to do with the silence of the fire.

Mr. *Philip Sugg*, Chairman of the defendant Company, said that they came to adopt the chessman Knight as a device simply by accident. An artist was given a sketch of the chessman Knight, which he coloured red; and at the foot of the sketch were the words, "Red Knight." That was how the name came to be used. They did not hear of the "Silent Knight" until the registration of the "Red Knight" was applied for. His Company had been in existence for nearly a hundred years, and had a considerable trade all over the country.

Mr. Justice ASTBURY said it had been proved that no device of a Knight or name of a Knight had been used in connection with a gas stove previous to the plaintiffs' mark. In April, 1926, the plaintiffs registered their mark comprised of the words "Silent Knight," and in December of the same year the defendants commenced to advertise a gas fire under the name "Red Knight." The plaintiffs immediately complained; and the defendants applied to register a mark consisting of a chess Knight with the words "Red Knight." In the following January the defendants agreed to amend their application by striking out from the mark the words "Red Knight;" and the plaintiffs understood this to mean that defendants would no longer use those words, and on this understanding did not further oppose defendants' application. The defendants had, however, throughout continued to use the words in connection with their gas stoves; and it was in respect of this that the action was brought. The plaintiffs had proved that, by reason of the use by the defendants of their name and description, there was not only a chance, but a certainty of confusion. Even managers of gas companies, who were an instructed class in this kind of apparatus, were liable to make, and did make, mistakes, owing to the similarity of the two names. The defendants knew they had no chance of getting their mark through without the plaintiffs' opposition, unless they consented to withdraw the words "Red Knight;" and they knew that plaintiffs supposed that that would mean withdrawing them altogether. The plaintiffs had proved that their mark had been infringed; and there would be an injunction to restrain the defendants from infringing it. There would also be an injunction restraining them from selling gas fires not of plaintiffs' manufacture as "Red Knight" stoves, and from using upon, or in connection with, such stoves any expression including the word "Knight" or the device of a Knight in any manner calculated to lead to the stoves being passed-off for those of plaintiffs' manufacture. He directed an inquiry as to damages, and ordered the removal of the defendants' mark from the register—the defendants to pay the costs of the action.

Premier Gas Mantles, Ltd.

In the Chancery Division, on Monday, July 2, Mr. Justice Maugham, in the Companies' Winding Up Court, heard the petition of F. Francis & Sons, Ltd., for an order for the compulsory winding up of Premier Gas Mantles, Ltd. His Lordship was reminded that the matter stood over as from June 18 last for settlement; but this had not been arrived at. His Lordship granted the petition.

Legal Responsibility for Gas-Works Fatality.

The Skipton Magistrates on June 30 gave their considered judgment in the case in which the Earby and Thornton Gas and Lighting Company were summoned for allowing new retort house machinery to be insufficiently fenced. The plant had been erected by West's Gas Improvement Company, of Manchester; and Frank S. Keats, a supervising engineer employed by the firm, died from injuries received by being whirled round shafting during what the defence contended was a trial run. The Gas Company urged that the plant was still under the control of the builders during the trial run, and that the gas undertaking was therefore not responsible. The contention of the Director of Public Prosecutions was that the Gas Company, as the owners of the new plant, were the responsible party; and the Magistrates decided that they had come into occupation of the premises, and were therefore liable. A fine of £10 was imposed, with £10 10s. costs.

MISCELLANEOUS NEWS.

IPSWICH MODERN HOME EXHIBITION.

By Radiation Ltd.

Every indication points to the unqualified success of the Modern Home Exhibition opened last Monday afternoon by his Worship the Mayor (Major Rowley Elliston), at the Co-operative Hall, Ipswich. The exhibition was organized by Radiation Ltd. to stimulate interest in gas appliances, and very enthusiastic assistance was given by the Ipswich gas undertaking to ensure its complete success. A number of officials of gas undertakings in the Eastern district were present; and Mr. F. W. Goodenough and Mr. J. C. Walker, the Executive Chairman and the Secretary respectively of the "B.C.G.A.," had come from London for the occasion. The visitors earlier had the opportunity of a private inspection of the exhibition, afterwards being entertained to luncheon by the Ipswich Gas Company.

Dr. Saleeby, O.B.E., followed the opening ceremony of the Mayor with a short address, and in the evening gave a most interesting lantern lecture, which was greatly appreciated. Dr. Pringle, the Medical Officer of Health, was in the chair.

On Tuesday, cookery demonstrations with the "New World" Regulo-controlled cooker were given by Miss Crawford-Fox, and particulars were announced of cake baking competitions, open to children and adults, for which valuable prizes will be awarded at the close of the exhibition, which runs until July 12.

Cookery demonstrations will be given at intervals throughout this period, varied by interesting lectures by Miss Julia Cairns, Dr. Hartley (of Radiation Ltd.), and others.

The exhibition hall has been cleverly laid out, and provides opportunity for the public to see Radiation gas appliances, for cooking, heating, hot-water, &c., in suitable settings. Admission is free to the public.

A full description of the exhibition will be given in the next issue of the "GAS SALESMAN."

HIGHGATE GOLF CLUB.

Cooking and Heating by Gas in New Premises.

The new house of the Highgate Golf Club, which has been built to replace the pavilion burned down three years ago is among the finest of its kind in the country.

In addition to lounges for the men and women members, a well-appointed bar, and dressing rooms, there is a spacious dining room capable of accommodating 80 people at a sitting. Meals can, however, be supplied for as many as 200; the cooking equipment in the club kitchen consisting of a large double oven gas range and hot closet, the products of Messrs. John Wright & Co., Ltd., of Birmingham. A gas-heated radiator, manufactured by the same firm, is installed in this apartment.

A number of these appliances are also distributed throughout the club premises for ready service during chilly weather. They are of the "St. Bernard" type, equipped with a copper reflector, the warm glow of which adds greatly to the cheerful appearance of these radiators. The gas supply to the radiators is automatically controlled.

Results at Stourbridge.—In his annual report on the working of the gas department for the year ended March 31, Mr. C. H. Webb, M.Sc., Engineer and Manager, states that the profit on revenue account is £21,520—an increase of £565. The sales of gas by prepayment meters are practically the same as last year, the public lighting is considerably more, while gas sold to ordinary consumers is less, due to the higher price in force during the year, necessary to recover to some degree the heavy expenses of the coal dispute. Mr. Webb has no doubt that with the reductions recently made the sales will increase in all directions. The balance from revenue account is subject to the usual deductions for income-tax, annual instalments, expenditure on mains, services, &c. The surplus, after these deductions, is £4306, which is almost double that obtained last year.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

The weakness reported during the last few weeks persists, and there is a shortage of trade in nearly all sections. The policy of maintaining prices is still being generally adhered to; but there is a good deal of idle time, and the tendency is certainly towards lower prices. In Northumberland, where there is actual agreement on the price question, there are at present no signs of a break; but competition from other districts is very severe, and the pits are in great difficulty. Prospects in Durham are perhaps not quite so black, and several long-term contracts have been fixed up in recent weeks, so that it is hoped that the weakness is only a seasonal phase. In the meantime, prompt demand is extremely slow, and gas coal collieries in general have not enough trade to keep them fully at work.

Wear Specials indicate 15s. 6d. f.o.b., best quality gas 14s. 9d. to 15s., and others 13s. 3d. to 13s. 9d. Coking coals have eased considerably, and, while best brands still quote 13s. 9d., there is difficulty in getting even 13s. 6d. Durham unscreened bunkers are quoted at 14s. 6d. for bests, and 13s. 3d. to 13s. 6d. for good ordinaries.

Coke is still in good demand, and gas sorts are selling for prompt shipment at 19s. 3d. to 20s. f.o.b.

YORKSHIRE AND LANCASHIRE.

Gas coals are moving slowly, and there is some indication of a movement to supply this material from North Country collieries.

Industrial fuel is inclined to be somewhat firmer. The export market has improved to some extent on account of the subsidy through the Five Counties Scheme. House coals maintain recent values, with secondary qualities predominant.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports:

South Yorkshire—Hards, Association, bunkers, 17s. 3d. to 17s. 6d., export 14s. 3d. to 14s. 6d.; screened gas coal, export, 14s. to 15s. 6d.; washed trebles, 15s. to 15s. 6d.; washed doubles, 14s. to 14s. 3d.; washed singles, 13s. 6d. to 14s.; washed smalls, 12s. 3d. to 12s. 6d. and 10s. to 10s. 3d.; rough slack bunkers, 11s. 6d. to 11s. 9d.; smithy peas, export, 16s. 6d. to 18s. 6d. per ton.

West Yorkshire—Hartley's (f.o.b. Goole), export, 13s. 9d. to 14s.; screened gas coal, 14s.; washed trebles, 14s. 9d. to 15s. 3d.; washed doubles, 13s. 6d. to 13s. 9d.; washed singles, 13s. 6d. to 13s. 9d.; washed smalls, 10s.; unwashed trebles, 14s.; unwashed doubles, 11s. to 11s. 3d.; rough slack, 8s. 9d. to 9s. 3d.; coking smalls, 7s. 9d. to 8s. 9d. per ton.

Derbyshire and Nottinghamshire—Top hards, bunker 16s. 6d. to 17s. 6d., export 14s. 3d. to 15s. 3d.; cobbles, 14s. to 15s.; washed trebles, 14s. 6d. to 15s.; washed doubles, 14s.; washed singles, 13s. 6d.; washed smalls, 12s. 3d. to 12s. 6d. and 10s.; unwashed doubles, export, 11s. to 12s.; rough slack, 11s. 6d. to 11s. 9d. and 9s. to 9s. 6d. per ton.

Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 15s. to 16s. and 12s. to 13s. 3d.; gas coke, export, 21s. to 23s.; furnace coke, 18s. 6d. to 19s. 6d.; washed steam bunker, 15s. 9d. to 16s. 3d. per ton.

MIDLANDS.

Market conditions tend to become more irregular. Householders are ordering grades of coal suitable for stocking. Merchants also have been induced by the special prices named in certain instances for June and July to enter into cautious commitments. One colliery producing a tough coal which is particularly immune from deterioration in the stack is working full time. This is a very exceptional case, however.

With the industrial demand still flat, the excess of slacks and smalls is rather more noticeable. Prices appreciably below the general level are accepted for spot lots. A Birmingham factor is reported to have bought Derbyshire D.S. nuts at 8s. 6d., including wagon hire. There is a fairly steady demand from the London district for bakers' nuts.

In the West Midlands, collieries outside the Five Counties Scheme are making better time than their competitors. That is accounted for in part, but only in part, by the fact that they have a position of natural strength in the market. The holding-up of merchants' wagons is attributed, in some instances at all events, to the control. This also is said to be alienating some trade from associated collieries.

TRADE NOTES.

New Purifiers for Preston.

The Preston Gas Company have recently placed an order for an installation of a large set of purifiers prepared for duplication, together with revivifying shed, with Messrs. Broadhead Constructions, Ltd., of 4, Chapel Walks, Manchester.

"Glow Worm" Boilers and Open Fires.

The "Glow Worm" Boiler and Fire Company, of 5, Newman Street, Oxford Street, London, W. 1, will in future carry on the sale of "Glow Worm" boilers and fires, hitherto marketed by Messrs. O. Bruster & Richardson, of 4, Lloyds Avenue, E.C. 3.

Littlehampton Gas Capital Issue.—The tenders for the 2000 £5 "B" shares in the Littlehampton Gas Company which Messrs. A. & W. Richards offered on behalf of the Directors ranged from £6 10s. down to the minimum of £5 15s. per share; the issue being considerably over-subscribed.

CONTRACTS OPEN.

Cookers, Fires, Gas Fittings, Mantles, Taps, Valves, &c.

The Warrington Gas Committee invite tenders for the above. [See advert. on p. 51.]

Fireclay Goods.

The Warrington Gas Committee invite tenders for the supply of fireclay goods. [See advert. on p. 51.]

General Stores.

The Warrington Gas Committee invite tenders for lime, bricks, cement, castings, ironmongery, vitriol, oil, &c., and the purchase of bye-products. [See advert. on p. 51.]

Meters.

The Warrington Gas Committee invite tenders for the supply of meters. [See advert. on p. 51.]

Oxide of Iron (New and Spent).

The City of Salford invite tenders for the supply of oxide of iron. [See advert. on p. 51.]

The Warrington Gas Committee invite tenders for new or spent oxide of iron. [See advert. on p. 51.]

Painting.

The Heywood Gas Department invite tenders for the painting of steelwork. [See advert. on p. 51.]

Pipes.

The Warrington Gas Committee invite tenders for cast and wrought iron and lead pipes and fittings. [See advert. on p. 51.]

Tar Stills.

The Warrington Corporation invite tenders for the supply of tar stills. [See advert. on p. 51.]

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *July 2.*

There is little business reported in the London tar products market, and values generally remain unchanged. Current prices are as follows:

Pitch, 65s. per ton.
Creosote, about 8d. per gallon.
Pure benzole, about 1s. 8d. per gallon.
Pure toluole, 2s. 1d. to 2s. 2d. per gallon.
Solvent naphtha, 95/160, 1s. 6d. to 1s. 7d. per gallon.
Pyridine, about 5s. to 5s. 3d. per gallon.

Tar Products in the Provinces.

July 2.

Markets for tar products generally are still very quiet indeed.

For pitch, there is very little inquiry; and while lower prices are reported to have been offered, there does not appear to be any pressure to sell.

Creosote oil is quiet, and the market is slightly easier.

Water-white products remain firm. Benzole particularly is in good demand; while a considerable amount of solvent naphtha has been sold for delivery over the next few months, also to the end of the year.

Crude carbolic is steady; but manufacturers are resisting the fall in price.

The market for cresylic acid shows no alteration.

There is still a fair demand for naphthalene, although business is difficult to negotiate at the prices asked.

The average prices of gas-works products during the week were: Gas-works tar, 40s. 6d. to 45s. 6d. Pitch—East Coast, 57s. 6d. to 60s. f.o.b. West Coast—Manchester, 51s. 6d. to 52s. 6d.; Liverpool, 54s. to 55s.; Clyde, 52s. 6d. to 55s. Toluole, naked, North, 1s. 5d. to 1s. 6d. nominal. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 1½d. to 1s. 2d. Heavy naphtha, North, 1s. to 1s. 0½d. Creosote, in bulk, North, liquid, 6½d. to 6⅝d.; salty, 6d. to 6¼d. Scotland, 6d. to 6¼d. Heavy oils, in bulk, North, 8¼d. to 8½d. Carbolic acid, 60 p.ct., 2s. 2d. to 2s. 2½d. prompt. Naphthalene, £13 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Benzole Prices.

The following are considered to be the market prices to-day:

	s. d.	s. d.	
Crude benzole . . .	0 10½	to 0 11	per gallon at works
Motor ,, . . .	1 4½	,, 1 5	,, ,, ,,
90 p.ct. ,, . . .	1 7	,, 1 8	,, ,, ,,
Pure ,, . . .	1 10	,, 1 11	,, ,, ,,

Sulphate of Ammonia for Home Agricultural Use in July.

Nitram Limited, Victoria Station House, S.W. 1, announce that the price of neutral sulphate of ammonia, basis 20·6 p.ct. nitrogen, for home agricultural use, during the month of July, will be £10 13s. per ton delivered carriage paid in 6-ton lots and upwards to buyer's nearest station, or *ex* works in 1-ton lots and upwards; all other terms and conditions as per their circulars 2/28N and 2A/28N.

The Hebden Bridge and Mytholmroyd Gas Board report gross profits for the past year amounting to £8487, and a net profit of £2209, as compared with a loss the previous year of £1440. This successful result is in spite of a decrease of 2,060,000 c.ft. in the output of gas.

News Items continued on p. 48.

STOCK MARKET REPORT.

THERE were signs of improvement in the stock markets last week. The worst of the depression appears to be over; and although the position is far from normal, confidence is gradually extending. In the more speculative sections, however, a certain amount of irregularity was still noticeable. The prices of gilt-edged securities moved within narrow limits, and the business done was small; but with more settled monetary conditions, a revival of interest is expected. Home Rails showed a slight improvement; but with the continued poor traffic returns it is hardly likely to be maintained.

The Gas Market maintained its steady progression. Business was good, and the transactions recorded were normal. It will be seen by the table that Maidstone 5 p.ct. capital stock received its long-delayed recognition; being marked up 5 points, to 114-117. The yield on the average price (115½) calculated on the dividend for the past twelve months—8½ p.ct.—is £7 7s. 2d. p.ct., so the stock is still an attractive proposition. Hornsey consolidated, South Metropolitan ordinary, Tottenham "B," and the three Sheffield stocks were also marked up. An announcement of interest is the placing privately of £2,000,000 Gas Light and Coke 5 p.ct. debenture stock at 99¾. Dealings free of stamp duty have already taken place at par.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 94¼, Commercial 100½, Croydon sliding-scale 108, European 8⅞, Gas Light and Coke 18s. 10½d., 18s. 11¼d., 19s., 19s. 0⅜d., 4 p.ct. preference 79¾, 3 p.ct. debenture 60½, Malta and Mediterranean 5⅝, Montevideo 94, South Metropolitan 106½, South Suburban 5 p.ct. 107, Tottenham 3½ p.ct. 96. Supplementary prices, British, Norwich 3⅜ p.ct. debentures 64¾, Cheltenham 4 p.ct. debenture 68½, Scarborough 5 p.ct. preference 84, Wandsworth 5 p.ct. debenture 101.

On Tuesday, Commercial 99½, 99⅞, 3 p.ct. debenture 58½, Continental Union 34, Croydon sliding-scale 110, maximum dividend 84, 85, 86, Gas Light and Coke 18s. 10½d., 19s., 18s. 10¾d., 3 p.ct. debenture 60, Imperial Continental 165½, 166, Montevideo 95, Primitiva 25s. 9d., 26s. 3d., South Metropolitan 106½, South Suburban 5 p.ct. 107, 5 p.ct. debenture 96, Tottenham "B" 96¾.

On Wednesday, Alliance and Dublin 93¼, Gas Light and Coke 18s. 10½d., 19s., 19s. 0⅜d., 19s. 1½d., 4 p.ct. preference 79½, 3 p.ct. debenture, 60¼, 60⅜, 5 p.ct. debenture 99½, Imperial Continental 165½, 166½, 166⅝, Primitiva 25s. 10½d., 26s., 4 p.ct. debenture (1911) 78½, 78¾, 79, South Metropolitan 106½, 106⅝, 107¼, 3 p.ct. debenture 60½, South Suburban 5 p.ct. 107. Supplementary prices, Hartlepool 82, 83, Southgate 107½.

On Thursday, British 115, 116, Cape Town 7⅜, 4½ p.ct. preference 6⅛, Commercial 100¼, Gas Light and Coke 18s. 10¼d., 18s. 11¼d., 19s. 1⅜d., 3½ p.ct. maximum 64, Imperial Continental 167, Maidstone 5 p.ct. 115, Newcastle and Gateshead 3½ p.ct. 16s. 7½d., 16s. 9d., Primitiva 25s. 9d., 26s. 1¼d., 4 p.ct. debenture (1911) 79, South Metropolitan 106½, 106¾, 107¼, 3 p.ct. debenture 60½. Supplementary prices, Lea Bridge 5 p.ct. preference 80½, 81, Tottenham 5 p.ct. 98½, 98⅝.

On Friday, Commercial 99¼, Continental Union 34, Gas Light and Coke 18s. 10½d., 19s., 19s 0⅜d., 19s. 1½d., 3½ p.ct. maximum 64¼, 3 p.ct. debenture 60¼, 60½, Imperial Continental 167, 167½, 168, Primitiva 25s. 9d., 25s. 9⅜d., 4 p.ct. debenture (1911) 78½, 79, South Metropolitan 106¾, 107. Supplementary prices, Guildford 100, Hornsey 4 p.ct. debenture 72, 74.

In Lombard Street, the demand for window dressing loans over the turn of the half-year was very large, and as high as 5½ p.ct. was paid by borrowers wishing to avoid going to the bank. Day-to-day conditions, however, were easy, varying from 3¼ to 3 p.ct. Treasury Bills were allotted at 2d. p.ct. above the previous week's average at £3 16s. 6·96d. p.ct., and discount rates were steady in consequence.

There was a fair amount of business done in the Foreign Exchange market, due, doubtless, to the closing of the half-year's accounts. The French exchange rose sharply to parity—124.21—and closed at 124.15. Pesetas closed at 29.52½; the New York rate was easier at 4.87 11/16; Italian lire finished at 92.72½ and Belgas at 34.91¾.

Silver was sold on Chinese account, the price closing at 27⅜d. per oz.; while gold remained nominally at 84s. 10½d. per oz.

The Bank rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21, 1927. The banks' deposit rate is 2½ p.ct., and the deposit rates of the discount houses are 2½ p.ct. at call and 2⅝ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends, Prev. Hf.Yr	Dividends, Last Hf. Yr.	NAME.	Quotations, June 29.	Rise or Fall on Week.	Transaction Lowest and Highest Prices.
£			%p.a	% p.a.				
171,978	Stk.	Feb. 9	5	5	Aldershot 5 p.c. max. C. .	74—79	..	..
412,992	,,	,,	4	4	Do. 4 p.c. Pref. . .	69—72	..	..
1,551,868	,,	Apl. 12	7	7	Alliance & Dublin Ord. .	93—96	..	93½—94½
374,000	,,	Jan. 12	4	4	Do. 4 p.c. Deb. . .	64—67	..	..
522,654	,,	Mar. 8	7	7	Barnet Ord. 7 p.c. . .	109—112	..	..
300,000	1	Apl. 26	1/7½	1/7½	Bombay, Ltd.	21/—23/-	..	..
170,000	10	Mar. 8	8½	8½	Bournemouth 5 p.c. . .	12½—13½	..	..
500,050	10	,,	7	7	Do. B 7 p.c. . .	12—12½	..	..
375,000	10	,,	6	6	Do. Pref. 6 p.c. .	10¼—11	..	..
50,000	Stk.	Jan. 12	3	3	Do. 3 p.c. Deb. .	56—59	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb. .	76—79	..	..
857,900	,,	Mar. 8	7½	7½	Brighton & Hove 6 p.c. Con.	116—119	..	..
341,880	,,	,,	6/8/6½	6½	Do. 5 p.c. Con.	103—106	..	..
1,387,500	,,	Feb. 23	5	5	Bristol 5 p.c. max. . . .	89½—90½a	..	..
885,000	,,	Mar. 22	8	7	British Ord.	113—116	..	115—116
100,000	,,	June 28	7	7	Do. 7 p.c. Pref. . .	111—114*	—3	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. .	73—76*	—1	..
200,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. .	94—97*	—1	..
100,000	10	May 24	6	8	Cape Town, Ltd. . . .	7½—8½	..	7⅞
100,000	10	Apl. 26	4½	4½	Do. 4½ p.c. Pref. . .	6¼—7½	..	6⅞
150,000	Stk.	June 28	4½	4½	Do. 4½ p.c. Deb. . .	70—75*	—2	..
698,860	,,	Feb. 23	6	6	Cardiff Con. Ord. . . .	98—101	..	..
337,860	,,	June 28	7½	7½	Do. 7½ p.c. Red. Deb. .	100—103*	—1	..
157,150	,,	Feb. 23	5	6½	Chester 5 p.c. Ord. . . .	88—93b	..	..
79,185	1	Apl. 26	12/-	12/-	Colombo Ltd. Ord. . . .	31/—33/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. .	20/—22/-	..	..
375,402	1	Apl. 12	1/9½	1/9½	Colonial Gas Assn. Ld. Ord.	23/—25/-	..	..
187,848	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	20/—22/-	..	..
2,073,280	Stk.	Feb. 23	5	7	Commercial Ord. . . .	98—101	..	99½—100½
475,000	,,	June 14	3	3	Do 3 p.c. Deb. .	57—60*	..	58½
800,000	,,	Sept. 29	11	11	Continental Union, Ltd. .	33—38	..	34
200,000	,,	Mar. 8	7	7	Do. 7 p.c. Pref. .	90—95	..	..
787,560	,,	Mar. 8	6½	7	Croydon sliding scale . .	108—113	..	108—110
408,100	,,	,,	5	5	Do. max. div. . . .	84—87	..	84—86
492,270	,,	Mar. 8	7	10	Derby Con.	115—130c	..	..
55,000	,,	June 28	4	4	Do. Deb.	71—78c*	..	..
909,000	,,	Mar. 8	5	5	East Hull Ord. 5 p.c. . .	76—79	..	..
50,000	,,	June 28	5	5	Eastbourne 5 p.c. Deb. .	91—96*	—2	..
1,009,180	10	Mar. 22	†4	†6	European, Ltd.	8—9	..	8⅝
18,703,480	Stk.	Feb. 9	5	5/1/6	Gas Light & Coke 4 p.c. Ord.	18/9—19/8f	..	18/10½—19/1½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. . . .	63—65	..	64—64½
4,167,020	,,	,,	4	4	Do. 4 p.c. Con. Pref. .	78—81	..	79½—79⅝
5,602,630	,,	June 14	3	3	Do. 3 p.c. Con. Deb. .	59—61*	..	60—60¾
181,815	,,	,,	6	6	Do. 6 p.c. Br'tf'd Rd. Db.	103—106	+2	..
1,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. .	98—100	—½	99½
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb. .	..	..	..
82,500	,,	Mar. 8	6½	6½	Hastings & St L. 5 p.c. Conv	87—90	..	..
958,740	,,	,,	6½	6½	Do. 5½ p.c. Conv.	68—71	..	..
70,000	10	Apl. 26	†10	†10	Hongkong & China, Ltd. .	13½—14½	..	..
178,200	Stk.	Mar. 8	5	5	Hornsey Con. 5½ p.c. . .	83—85	+1	..
1,976,000	,,	May 24	10	10	Imperial Continental Cap.	164—169	..	165½—168
223,180	,,	Feb. 9	8½	8½	Do. 8½ p.c. Red. Deb.	68—70	..	..
285,342	,,	Mar. 8	7	7	Lea Bridge 5 p.c. Ord. . .	94—97	..	..
2,145,907	,,	Feb. 23	5½	5½	Liverpool 5 p.c. Ord. . .	92—95b	..	..
600,000	,,	Mar. 22	7	7	Do. 7 p.c. Red. Pref.	101½—103½b	..	..
165,786	,,	Feb. 23	9	8	Maidstone 5 p.c. Cap. . .	114—117	+5	115
75,000	5	June 14	18	18	Malta & Mediterranean .	5½—5⅝*	..	5⅝
541,920	Stk.	May 24	†5	†7	Montevideo, Ltd. . . .	93—95	..	94—95
2,051,315	,,	Mar. 8	5	5	Newcastle & Gateshead Con.	16/9—17/3d†	..	..
860,929	,,	,,	4	4	Do. 4 p.c. Pref. .	74½—75½d	..	..
691,705	,,	June 28	3½	3½	Do. 3½ p.c. Deb. .	65—66d*	—1½	..
131,760	,,	Mar. 8	6/18/0	6/18/0	North Middlesex 6 p.c. Con.	97—100	..	..
300,000	,,	Apl. 26	9	7	Oriental, Ltd.	116—121	..	..
188,190	,,	June 28	7½	7½	Plym'th & Ston'house 5 p.c.	105—110*	—3	..
414,500	,,	Feb. 23	7½	7½	Portsm'th Con. Stk. 4p.c. Std.	101—104	..	..
286,732	,,	,,	5	5	Do. 5 p.c. max.	77—80	..	..
2,334,464	1	—	—	—	Primitiva Ord.	25/6—26/6	—/3	25/9—26/3
244,500	100	June 1	4	4	Do. 4 p.c. Red. Deb. . .	91—94*	..	..
695,000	Stk.	Jan. 26	4	4	Do. 4 p.c. Red. Deb. 1911	77—79	+1	78½—79
416,845	,,	June 28	4	4	Do. 4 p.c. Cons. Deb. . .	75—77*	..	..
150,000	10	Mar. 22	6	6	San Paulo 6 p.c. Pref. . .	8½—8¾	..	..
270,000	Stk.	Mar. 22	6	6	Sheffield A	102—104e	+1	..
419,968	,,	,,	6	6	Do. B	102—104e	+1	..
1,047,000	,,	,,	6	6	Do. C	102—104e	+1	..
90,000	10	June 14	6	8	South African	4—6*	..	..
6,609,895	Stk.	Feb. 23	5	7½	South Met. Ord.	106—108	+½	106½—107½
500,000	,,	,,	—	6	Do. 6 p.c. Irred. Pf.	110—113	..	..
1,895,445	,,	Jan. 12	3	3	Do. 3 p.c. Deb. . .	59—62	..	60½
784,000	,,	Mar. 8	6½	6½	Do. 6½ p.c. Red. Db.	100—102	..	..
91,500	,,	Feb. 23	8½	8½	South Shields Con. . . .	112—113d	..	..
1,248,795	,,	Feb. 23	6½	6½	South Suburban Ord. 5 p.c.	105—108	.	107
868,887	,,	June 28	5	5	Do. 5 p.c. Deb.	94—97*	—1	96
647,740	,,	Mar. 22	5	5	South'mpton Ord. 5 p.c. max.	78—80	.	..
121,275	,,	June 28	4	4	Do. 4 p.c. Deb.	72—75*	—1	..
250,000	,,	Mar. 8	7	7	Swansea 7 p.c. Red. Pref. .	100—103	..	..
200,000	,,	June 28	6½	6½	Do. 6½ p.c. Red. Deb.	98—101*	—2	..
120,000	,,	Feb. 23	7½	7½	Tottenham District A 5 p.c.	115—120	..	..
883,275	,,	,,	6½	6½	Do. B 3½ p.c.	95—98	+1	96—96½
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	98—101	..	..
181,255	,,	June 14	4	4	Do. 4 p.c. Deb.	76—79*	..	..
					Uxbridge, Maidenhead, &			
289,094	,,	Mar. 8	6½	6 5/16	Wycombe 5 p.c. . . .	90—95	..	..
98,880	,,	,,	5	5	Do. 5 p.c. pref. .	86—90	..	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	,,	Mar. 8	8½	8½	Wandsworth A 5 p.c. .	129—134	..	..
255,686	,,	,,	7	7	Do. B 5½ p.c. .	111—116	..	..
432,585	,,	,,	5/19/0	5/19/0	Do. C and New	98—103	..	..
852,000	,,	,,	6⅝	6⅝	Do. Wimbledon 5 p.c. .	106—111	..	..
98,000	,,	,,	7½	7½	Do. Epsom 5 p.c. . .	112—117	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Pref . . .	86—91	..	..
88,416	,,	June 28	3	3	Do. 3 p.c. Deb. . . .	56—59*	—1	..
284,743	,,	,,	4	4	Do. 4 p.c. Deb. . . .	75—78*	—2	..

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle. e.—Sheffield. f.—The quotation is per £1 of Stock. * Ex. div. † Paid free of income-tax. ‡ For year.

Reduced Price at Shipley.—The Shipley Gas Committee have recommended a reduction in the price of gas from 1s. 2d. to 1s. 1d. per therm.

Cardiff Photographs.—We were particularly fortunate in the personal photographs we were able to secure in connection with the Cardiff Meeting of The Institution of Gas Engineers; and for some of these we were indebted to the "South Wales News."

Increased Sales at Carlisle.—The financial results of the Carlisle Gas Department for the year ended March 31 (states Mr. J. E. Blundell, the Engineer and Manager, in his annual report) show a net profit of £10,614, compared with £798 for the preceding twelve months. The gas sold was 521 million c.ft., as against 501 millions in 1926-27; and consumers have increased from 14,720 to 15,500.

New Joint-Stock Companies.—British Benzole and Coal Distillation, Ltd., has been registered with a nominal capital of £250,000 in 400,000 preferred ordinary shares of 10s. each and 1,000,000 deferred shares of 1s. each. Carbocite Smokeless Fuel, Ltd., has a nominal capital of £30,000 in 25,000 preference shares of £1 each and 100,000 deferred shares of 1s. The Illingworth Carbonization Company (to take over the existing Illingworth Carbonization Company, Ltd.) has a nominal capital of £85,000 in 5s. shares.

Exhibition of Local Industries at the Agricultural Hall.—Within the boundaries of Islington are numerous works and factories, large and small; and many of their products were on view at the Industrial Exhibition at the Agricultural Hall, held in connection with the borough's Civic Week, from June 10 to 16. Among the manufactures represented were machinery of all kinds, engineering goods, heating and lighting equipment, household appliances, &c. One of the largest exhibits was that of the gas industry, which occupied a central position in the main hall. At this stand were displayed lamps worked on the pneumatic distance switch principle, a model kitchen with automatic "Regulo" controlled gas cooker and independent boiler, armoured gas fires in wrought metal, water heaters, geysers, and domestic refrigerators.

Good Working at Bolton.—The Bolton Gas Committee's report for the year ended March 31 shows that the consumption of gas was slightly less than in 1927. That year, however, was abnormal; and the 1928 consumption is a decided increase on the year 1926. The increased sales of apparatus are satisfactory. The fine premises in Spa Road have fully justified their cost. Improved conditions for the workmen are available, also better organization is possible, together with reduced cost of transport. Part of the gas office premises have been converted, and provide a room for demonstrations of cookery and the use of other gas apparatus. This, along with the existing showrooms, will enable consumers to become better acquainted with the utility of gas. The gross profit for the year is £68,689; £14,000 has been transferred to the renewals fund, and £6603 has been allocated as revenue contribution to capital, leaving a net balance on the year of £3745.

Electric Fault Cuts off Gas Supply.—A partial stoppage of electricity services in various parts of West Yorkshire, served by the Yorkshire Electric Power Company, was caused by breakdown of a high-pressure cable at Pontefract, which damaged switchgear at the Ferrybridge power station. While excavating to repair the cable, the cable company (repairing under a maintenance contract) let down one of the Pontefract town gas mains, which cracked, and deprived a large part of the district of its gas supply.

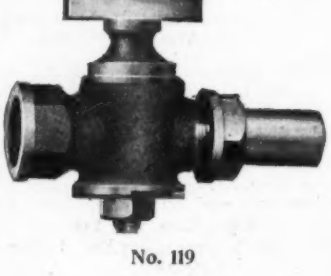
Bradford Encourages Students.—The Bradford Corporation Gas Committee have advanced the salary of Mr. W. I. Ineson, Chief Chemist, by £10 a year, on his having been awarded the diploma in Gas Engineering by The Institution of Gas Engineers, and have defrayed the recipient's expenses for going to Cardiff to receive the diploma. Arising out of this matter, the Finance and General Purposes Committee of the City Council recommended that the examination for the diploma in Gas Engineering of The Institution of Gas Engineers be added to the schedule of examinations set out in the Council's salary scheme in respect of which an increase is given and a grant made covering the amount of examination fees payable.

Lower Prices at Cheadle.—The Gas Committee reported to a recent meeting of the Cheadle Rural Council that they had considered the accounts of the gas undertaking for the year ended March 31, from which it appeared that there was a profit of £1359 on the revenue account; and after payment of principal and interest on loans, the net revenue account showed a balance of £239, which they considered very satisfactory. They had also considered a detailed estimate, prepared by the Gas Manager, of the receipts and expenditure for the current year, and they recommended that as from April 1 last the price of gas be reduced from 1s. 4d. to 1s. 2d. per therm, and that 5 p.ct. discount be allowed to all consumers for prompt payment. These recommendations were adopted.

Progress of the Glastonbury Gas Department.—The report of the Manager and Secretary (Mr. D. E. Garlick) shows that the quantity of gas made in the twelve months ended March 31 last was 52,149,200 c.ft. Alderman J. Coleby Morland, referring to the accounts at a recent meeting of the Town Council, pointed to the fact that the sales of gas were increasing satisfactorily, while the percentage unaccounted for was being reduced. The gross profit, at £6032, was £427 more than two years ago. He said they had a very valuable undertaking, which was profitable to the ratepayers. He was certain that anyone who knew what the works were to-day, and what the cost was, would be perfectly aware that the undertaking was worth twice as much as the sum they had paid for it. He reminded the Council that the output to-day was two-and-a-half times what it was when they took over the works twenty-five years ago. Mr. J. Alexander testified to the able way in which the Manager and Secretary administered the undertaking. Mr. Brake also commented on the manner in which the works had been maintained, and expressed satisfaction at the good management.

SOLID PLUG MAIN TAPS

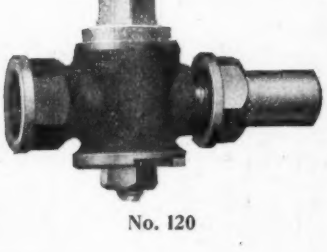
ROUNDWAY



No. 119

PRICES RIGHT

QUALITY RIGHT



No. 120

MAY WE QUOTE YOU?

A SAMPLE WITH PLEASURE.

SAWER & PURVES

(BRANCH OF METERS, LTD.)

NELSON METER WORKS, MILES PLATTING, MANCHESTER.

RADFORD METER WORKS, RADFORD ROAD, NOTTINGHAM.

45 & 47, WESTMINSTER BRIDGE ROAD, LONDON S.E.1.